

# BUREAU OF RECLAMATION ACCOMPLISHMENTS



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF RECLAMATION  
JUNE 1992

WATER RESOURCES MANAGEMENT . . .  
... FOR THE FUTURE.

# OUR MISSION

*To manage, develop,  
and protect water and  
related resources in an  
environmentally and  
economically sound  
manner in the interest  
of the American public.*



# **Bureau of Reclamation**

**Fiscal Years  
1989, 1990, and 1991**

United States  
Department of the Interior

August 1992

## **MISSION STATEMENTS**

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally-owned public lands and natural and cultural resources. This includes fostering wise use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also promotes the goals of the Take Pride in America campaign by encouraging stewardship and citizen responsibility for the public lands and promoting citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. Administration.

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The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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## Introduction

The success of an agency and its programs can be measured by its mission accomplishments. This report provides a summary description of the Bureau of Reclamation's (Reclamation) significant accomplishments for fiscal years (FY) 1989, 1990, and 1991. Accomplishments are presented in a format consistent with Reclamation's Strategic Plan, which sets forth the long-term framework for Reclamation as we enter the twenty-first century.

## Reclamation's Mission

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

As a steward of public resources, Reclamation emphasizes sound business practices internally, demonstrates fiscal responsibility in its external financial practices, and fosters an effective human resources management and development program.

## The Strategic Plan

Reclamation's Strategic Plan provides the broad, long-term framework under which annual programs and budgets will be prepared. It is based on key concepts and objectives such as: the need for a Federal presence and a role for Reclamation; a broad constituent/customer base; human resources development and employee involvement; creative partnerships with others; fiscal responsibility; appropriate balance of uses; environmental improvements; sustained economic growth; and an enhanced quality of life.

The Strategic Plan consists of 5 sections containing a total of 25 program elements:

Section 1, **Managing and Developing Resources**, sets forth the goals Reclamation will seek to achieve in water resource conservation, management, and development. The keynote of this section is a balanced approach to the stewardship of the West's scarce water and associated land and energy resources.

Section 2, **Protecting the Environment**, recognizes that increased environmental knowledge and changing societal values have placed an ever greater emphasis on the protection of our natural resources. The goals in

this section, which focus on the need for an environmentally sound program, are a logical extension of Reclamation's increased efforts to improve the management of existing resources.

Section 3, **Safeguarding the Investment**, addresses the fact that the Nation has invested approximately \$16 billion in Reclamation facilities since 1902 and that those facilities must be protected, maintained, and improved for the benefit of present and future generations.

Section 4, **Building Partnerships**, recognizes that Reclamation must pursue opportunities for building new partnerships if it is to resolve complex natural resources management, development, and protection issues to provide for further economic growth and an improved quality of life.

Section 5, **Fostering Quality Management**, stresses Reclamation's commitment to human resources management and organizational excellence. The goals in this section are a clear expression of Reclamation's commitment to make its employees the best they can be and, in turn, allow Reclamation to effectively and efficiently carry out its mission.

Implementation Plans are being developed for each of the 25 elements of the Strategic Plan. These plans will have a shorter focus and will detail "how" the strategies will be carried out in the immediate future. The plans will set forth specific actions and activities to be accomplished, the schedule and priorities for their accomplishment, and the financial and personnel resources needed. The Implementation Plans will provide the basis for program formulation and evaluation, action plans and initiatives, development of future budget requests, allocation of personnel resources, and establishment of priorities.

## **Program Accomplishments**

Reclamation's appropriated funds for FY89, 90, and 91 averaged about \$1 billion annually, with 67 percent of those funds going to Construction Program activities, 20 percent to Operation and Maintenance Program work, and the remainder to General Investigations, General Administrative Expenses, and other programs.

During those 3 years, Reclamation increasingly focused on more effective and efficient use of existing resources and on carrying out program activities in a more environmentally compatible manner. While the formal development and publication of the Strategic Plan was not completed until 1992, accomplishments during the past 3 years have increasingly sought to meet the goals and strategies developed for the Strategic Plan. Accordingly, Reclamation accomplishments listed in this report are presented under the 25 elements of the Strategic Plan.

For each of the five sections of the Strategic Plan, a brief introduction describes the overall program objectives. The goal of each element is stated, followed by brief descriptions of accomplishments in FY89, 90, and 91.



# **Program Accomplishments for Fiscal Years 1989, 1990, and 1991**

## **MANAGING AND DEVELOPING RESOURCES**

From its inception in 1902, the Reclamation program has emphasized development of safe and dependable water supplies and hydropower resources to foster the settlement and economic growth of the Western United States.

Because of increased environmental knowledge and awareness and Federal budgetary constraints in recent years, Reclamation has placed a greater emphasis on improving the management of existing projects and facilities. Multiple uses of water and improved water conservation, management, and project operations offer significant opportunities to help meet both growing economic and environmental water needs.



*Project operations and management should reflect appropriate consideration of all uses including water supply, river regulation, power generation, fish and wildlife resources, recreation, flood control, improvements to water quality, and navigation.*

Reclamation is using both structural and nonstructural approaches to accomplish the following:

- Facilitate efficient conjunctive and basin-wide use of surface water and ground water.
- Increase water reclamation and use.
- Improve hydropower generation efficiency and capability.
- Meet growing municipal and industrial, domestic, and agricultural water demands.
- Improve watershed yields.
- Improve the quality of water.
- Protect and enhance recreational, fish and wildlife, and other environmental values associated with Reclamation projects.

These efforts also include facilitating voluntary water transfers, exchanges, reallocations, and waterbanking arrangements to more effectively use available supplies.

Even with these efforts, our growing Nation will require the development of additional traditional and nontraditional water and energy supplies that are economically and environmentally sound. The margin of reserve between supply and demand for both water and power has diminished significantly in many parts of the Nation to the point that all water needs cannot be met for an increasing range of hydrologic events. The prolonged drought in California and other areas of the West has greatly stressed available water supplies. Requirements to protect endangered species, preserve and enhance wetlands, and settle Native American water right claims have further burdened existing developed water resources. The result is growing conflict between economic and environmental uses.

Resolving conflicts by adopting tradeoffs among competing uses causes reduced benefits and results in loss of economic growth, a lack of environmental improvements, or a reduction in the quality of life. Sustaining economic growth, improving the environment, and enhancing the quality of life should not be mutually exclusive objectives. Reclamation has pursued a balanced program that stresses innovative water management and increased environmental compatibility of existing projects to avoid tradeoffs between economic and environmental needs.

Our Nation also faces an urgent need for safe and reliable water supplies for many areas of rural America, Native American tribes, and United States-administered Territories and Commonwealths. Therefore, improved management is being combined with the development of economically justified and environmentally compatible projects in a balanced approach to meeting the Nation's resource needs.

Reclamation's water and power infrastructure are significant national assets that have played and will continue to play an important role in the economic and environmental well-being of our country. Our focus on improved asset management, in partnerships with others, will lead to added value and increased benefits with respect to meeting future economic and environmental needs.

Whether future water and power needs are met structurally or nonstructurally, both supply and demand must be managed more effectively and efficiently. This requires increased use of real-time hydrometeorological data networks to improve forecasts and facilitate timely operational decisions.

Reclamation's technical and scientific expertise and resources are being applied to the development of "Best Management Practices" and new technology for the most effective and efficient use of water, energy, land, and related resources through a cooperative, cost-shared research and technology transfer program. Research for improved water treatment technologies offers tremendous opportunities to recover contaminated waters, augment water supplies, reuse water, and to effectively meet Safe Drinking Water Act and Clean Water Act requirements. Research is continuing on the potential impacts of global climate change on water resources of the West and on ways to reduce such impacts.

## **Water and Power Operations**

*Goal: To improve the efficiency and effectiveness of project operations.*

*Major activities include the following:*

**Reclamation projects** were operated to provide water and power to project beneficiaries. As the largest supplier and manager of water in the West, Reclamation delivered approximately 30 million acre-feet of water each year to 28 million people. About 25 million acre-feet of that water provided irrigation on about 10 million acres to produce annual crops valued at close to \$9 billion. Reclamation's 52 hydropower plants generated over 40 billion kilowatthours of electricity each year, making Reclamation the eleventh largest producer of electric power in the Nation.

The following project features are in operation on Reclamation projects.

- 440 storage dams and dikes
- 355 storage reservoirs
- 254 diversion dams
- 16,050 miles of canals
- 1,510 miles of pipelines
- 280 miles of tunnels
- 54,200 miles of laterals and drains
- 249 pumping plants over 1,000 horsepower
- 52 hydroelectric powerplants
- 1 coal-fired powerplant (Reclamation is entitled to  
24.3 percent of Navajo Generating Station power)

Reclamation initiated **development of an Advanced Decision Support System (ADSS)** which will apply the latest technology in artificial intelligence, expert systems, and computer graphics to increase understanding and improve the effectiveness of river basin and water system operations. This technology is being transferred to five agencies in the Santa Anna River basin of California. Other agencies have also asked for the technology, and Reclamation is developing agreements for the public use of the software.

Efforts were initiated to **identify and resolve instream flows and water management issues** for major multiple use rivers and river basins, through projects such as the Platte River Management Joint Study, the Upper Snake River Basin Storage Optimization Study, and the American River Folsom South Optimization Study.

An **international water management agreement** was signed with Canada for the St. Mary and Milk Rivers, Montana.

**Annual Operating Plans** were developed and implemented for river basins controlled by Reclamation projects and for most individual projects and dams. These plans are used to inform water users, states, and the general public of our expected project operations in the coming water year. Examples of Annual Operating Plans prepared include:

- > Colorado River Basin
- > Upper Missouri River Basin

- Central Valley Project
- Niobrara, Lower Platte, and Kansas River Basins
- North Platte River Basin
- Colorado-Big Thompson Project
- Fryingpan-Arkansas Project
- Bonneville Unit, Central Utah Project
- Rio Grande Project
- Weber Basin Project
- Columbia River System Operation Review (in conjunction with Corps of Engineers and Bonneville Power Authority)

A 5-year review of the **Long-Range Coordinated Operating Criteria for Colorado River Reservoirs** was initiated.

Reclamation implemented an "**Enhancement of Existing Projects**" initiative to pursue ways to improve project efficiencies and more effectively meet increased demands for water resources.

In cooperation with Western Area Power Administration, a **power optimization model** was developed to schedule water releases from Hoover, Parker, and Davis Dams (Colorado River) on an hourly basis in accordance with downstream water demands, physical and institutional constraints, and electrical loads.

Generation at all Colorado River Storage Project **powerplants**, with the exception of Fontenelle Dam, was placed under **supervisory control** by Reclamation from Page, Arizona (Glen Canyon Dam). Western Area Power Administration provides supervisory control from Montrose, Colorado, for all dispatching and transmission.

Yellowtail Powerplant operations were placed under **remote control operation** from the Casper Control Center in 1991, reducing operational costs and increasing efficiency.

New operating procedures and criteria for the recently modified **Buffalo Bill Dam and Powerplants** were developed, including instream flow requirements for fishery enhancement.

Reclamation initiated the **comprehensive system operation review** of the Federal facilities that are included in the Columbia River coordinated power system with the Corps of Engineers and Bonneville Power Administration.

Reclamation initiated the **East Mesa Pilot Ground Water Recharge and Recovery Test Program** in Imperial County, California. A recharge demonstration project recharged about 17,000 acre-feet in 1988 and 1989. During the summer of 1990, an additional 500 acre-feet was recharged. Ground-water monitoring of the recharge mound continues. Construction and operation of four recovery wells are planned for 1992 pending funding.

Reclamation initiated a process for renewal of **long-term water service contracts for the Central Valley Project, California**, including environmental impact studies and coordination with Fish and Wildlife Service and other Federal and State agencies consistent with our responsibilities under the Fish and Wildlife Coordination Act and the Endangered Species Act.

## Water Conservation

*Goal: To foster improvements in the efficiency of use and management of water supplies provided by Reclamation and non-Federal projects.*

*Reclamation accomplishments during fiscal years 1989, 1990, and 1991 include:*

Development of a **program to enhance water conservation** was initiated.

**Water Conservation and Advisory Centers** were established in Pacific Northwest, Upper Colorado, and Great Plains Regions. These centers will coordinate water conservation programs, provide information on water supplies and conservation opportunities, provide technical assistance and technology transfer, provide training programs, and promote public education programs. Centers will also be established in the Mid-Pacific and Lower Colorado Regions, the Denver Office, and the Washington Office.

Reclamation initiated investigations to develop integrated and **comprehensive water conservation plans** which will emphasize more efficient and effective use of existing water supplies. Reclamation worked with water users and other entities to pursue opportunities to conserve water on existing projects through rehabilitation, structural modification, or operational changes.

A **canal lining demonstration program on the Deschutes Project, Oregon**, was initiated for the purpose of conserving water. Contracts will be negotiated with at least 10 firms for different canal lining techniques, with the firms contributing 50 percent of the cost. This program is scheduled to be completed in 1993.

Reclamation completed a **prototype project on the Coachella Canal** in California to demonstrate techniques for lining canals while they remain full of water. This process allows water deliveries to continue while canals are lined to reduce seepage losses.

Expansion of Pacific Northwest Region's cooperative **AgriMet weather and crop water use information network** continued. Originally co-sponsored by Reclamation and the Bonneville Power Administration in support of regional energy and water conservation programs, AgriMet now provides expanded data support for onfarm irrigation management and scheduling programs throughout the Pacific Northwest.

Reclamation contracted with the California Department of Water Resources for review and assistance in developing **water conservation plans** in the Mid-Pacific Region required by Section 210 of the Reclamation Reform Act.

Reclamation signed agreements with the Nebraska Game and Parks Commission and Mirage Flats Irrigation District to provide a **minimum pool for fish and recreation in Box Butte Reservoir** through a cooperative water conservation program.

## Drought Management

*Goal: To manage resources to lessen the impacts of droughts.*

*Many parts of the West experienced the fifth consecutive year of drought conditions in 1991. Reclamation implemented drought management measures to allocate and conserve water supplies, especially where reservoir inflow was severely below average. Activities to help reduce the impacts of water shortages included:*

A **Reclamation Drought Coordination Team** was established to serve as a clearinghouse and source of drought information. Reclamation participated on a Federal/State Drought Management Team.

**Monthly reports on drought conditions** were provided for use by water users and project operators to help them make timely decisions and to enhance public awareness.

Reclamation worked with State drought response programs to **disseminate information on water supply** and on Reclamation programs for drought response.

Reclamation facilitated the establishment of two **new waterbanks** in the State of Idaho on the Boise and Payette River systems.

Reclamation facilitated voluntary **water transfers** between Central Valley Project water users and worked with Colorado River water contractors in California on water conservation and voluntary water transfer opportunities.

Projections of low runoff in 1991, combined with already depleted reservoir storage, led to announcements of substantial water shortages to the Central Valley Project contractors. In early March 1991, Reclamation established provisions to provide **emergency water for cases of extreme hardship in the Central Valley Project** as follows:

- In 1991, **municipal and industrial (M&I) water users** (under current permanent contracts or with historical annual temporary contracts) were provided an additional



26,000 acre-feet of water to protect public health (basic needs to maintain life and maintain cleanliness to control disease) and safety (fire protection).

- In 1991, **irrigation water users** with permanent contracts were provided an additional 78,000 acre-feet of water to prevent economic hardships because of the potential loss of trees and vines.
- In 1991, 228,000 acre-feet of water was delivered to mitigate the effects of the drought on **wildlife refuges and fish and wildlife resources**.

Reclamation participated in the **California Emergency Water Bank**. Reclamation helped determine the quantities of water available for purchase, reviewed the condition of ground-water wells, approved transfers of base water right supplies from Reclamation service areas to other areas of need, and helped coordinate joint Reclamation and State project operations.

Reclamation allowed the Metropolitan Water District of Southern California to divert Colorado River water at the full capacity of its aqueduct to help **meet water shortages resulting from reduced water deliveries by the State Water Project and other sources**.

**The Central Valley Project was operated to the extent possible to meet varied needs** while still reducing economic and environmental impacts of the drought. For example, to protect the recreational economy of one area, Reclamation, in cooperation with other water interests, purchased a block of water and left it in the reservoir during the summer recreational season. The water was then released down river to meet the needs of migrating fish and finally stored in a wildlife refuge to meet the needs of migratory waterfowl.

Through the **Small Reclamation Projects Act** program, Reclamation provided the opportunity for many water districts subjected to the drought to store and move water to lessen the impacts of the drought. Specifically actions included:

- **The Ramona Dam, California**, had sufficient water stored to help during the most severe summer months.

- **The Day Creek Project, California**, was able to recharge its ground-water basin more efficiently.
- **The Lake Elsinore Project, California**, was able to use wells to offset some of its water demands.

The Pacific Northwest Region has established a **network of automated agricultural weather stations called AgriMet** in cooperation with numerous sponsors throughout the region. Through regional analysis of daily crop water use, crop models translate real-time climate data from approximately 40 sites into crop water use data for publication in local newspapers. Reclamation assisted water users in improved irrigation scheduling.

Reclamation worked with the State of Wyoming to cost share major construction of several stream sections at gauging stations to **improve water management**.

*On April 10, 1991, President Bush signed Public Law 102-27, the Supplemental Drought Emergency Appropriation, providing \$25 million to Reclamation's Construction Program appropriation "to meet the emergency needs for areas stricken by drought." Under that appropriation, Reclamation initiated work on 32 emergency drought response activities in the five regions, totalling \$14.7 million, and approved 28 requests totalling \$10.3 million for fish and wildlife drought mitigation activities. Activities included:*

Sandbars were removed from **Bella Vista Pumping Plant** intake to assure adequate water supply during low-flow conditions.

A water distribution system was constructed within the **Butte Sink National Wildlife Refuge**, resulting in water savings that will improve water quality and make it possible to better monitor and regulate streamflows.

Water chillers were installed at the **Coleman National Fish Hatchery** to provide cold water for the incubation of chinook salmon eggs.

A temporary water diversion sill was installed at **Coleman National Fish Hatchery** to intercept additional flows at the low water level to maintain fish production.

Water control structures were purchased and installed at **Glenn Colusa Irrigation District diversion facilities** to permit Reclamation to monitor and maximize water operations so sufficient water supplies will be available to meet downstream fish and wildlife requirements.

Reclamation funded Fish and Wildlife Service's purchase of water needed to meet the difference between the drought-year water delivery allocations of **Central Valley Project Refuges** and their environmental requirements to meet their biologic water quantity needs.

Reclamation funded purchase of an additional 33,500 acre-feet of water for the **Grassland Water District Refuge**.

Existing wells in the **Kern National Wildlife Refuge** were rehabilitated.

A water distribution system was constructed within the **Kesterson National Wildlife Refuge**, resulting in saved water that could be used for irrigation, fish, wildlife, or water quality purposes and made it possible to better monitor and regulate streamflows needed to maintain water quality.

New wells were developed in the **Kesterson, Pixley, Sacramento, and San Luis National Wildlife Refuges**.

Reclamation rehabilitated and modernized obsolete fish trap facilities at **Keswick Dam** to enable operation at multiple levels of riverflow and to make the traps more effective. The fish traps serve as a fish collection facility for migrating anadromous fish, which are subsequently transported by truck to the Coleman National Fish Hatchery where the eggs are released into fish rearing ponds.

Reclamation rehabilitated five existing water wells and one surface water delivery system to restore capacity and increase water management capabilities within the **Merced National Wildlife Refuge**.

A pump extension was built on the **Sacramento River near Verona** to accommodate changes in operations to meet the reasonable and prudent alternatives contained in the biological opinion issued by the National Marine Fisheries.

Reclamation provided engineering services and geohydrologic evaluations and recommendations for all **proposed wells to supply water for wildlife purposes**, completed test wells, performed E-log and water quality testing, and provided construction management.

Internal water system improvements at the **San Luis National Wildlife Refuge** were performed to provide wetland habitat for the benefit of migratory wildlife and to eliminate the potential buildup of nutrients in the ground water.

Reclamation modified **Trinity Fish Hatchery** intake and added chillers to provide cool water and protect migrating fish.

A rock barrier was installed on **Trinity River** to ensure that water operations would be maximized to preserve water storage and that water delivery schedules and releases can be coordinated to minimize water waste.

Reclamation used drought funds to extend riprap on the face of **Harlan County Dam in Nebraska** (a Corps of Engineers project). The extension of the riprap will enable additional irrigation water to be supplied to the Reclamation project served by this reservoir. The Corps of Engineers and Reclamation have also developed and agreed on a reservoir operation plan for 1992 which will allow the continued use of water for irrigation while still recognizing recreational interests.

A report was submitted to the Congress in FY91 summarizing Reclamation's accomplishments in response to the **Reclamation States Drought Assistance Act of 1988** and recommending improvements in Federal response to future drought through

more effective drought management contingency planning. This led to the enactment of the Reclamation States Emergency Drought Relief Act of 1991.

## Project Development

*Goal: To pursue cost-shared development of economically justified and environmentally compatible multipurpose projects needed to accomplish national resource management objectives.*

*Reclamation's planning program focused on avenues other than developing major structures as ways of effectively meeting water needs, with emphasis on improving the management of existing water resources. Examples of studies initiated include:*

**Sierra Vista Wastewater Reclamation and Reuse Study (Sierra Vista, Arizona).** This study was undertaken to develop wetlands habitat and to condition wastewater prior to ground-water recharge for other uses in Arizona.

**Southern California Comprehensive Water Reclamation and Reuse Program.** This study comprehensively examined wastewater reuse in conjunction with local water interests.

**Indian Well Study (Ridgecrest, California).** Reclamation drilled numerous 2,000-foot deep wells and developed a hydrologic detail of the valley's water resources and a plan for conserving those resources.

**Flathead River Basin Storage Optimization, Montana.** This study addresses the multiple water demands and water uses of the Flathead River basin and related portions of the Clark Fork drainage in western Montana. Options and capabilities for meeting future demands for instream flows, supplemental irrigation, power, fish and wildlife, and recreation are being evaluated.

**Grande Ronde Water Optimization, Oregon.** This study is evaluating measures to enhance streamflows and improve water quality through watershed and riparian improvements, water conservation, and offstream storage development as part of a multiparty effort to improve habitat for the endangered and threatened salmon runs in the Grande Ronde and Snake River basins.

**Idaho River Systems Management, Idaho.** Reclamation is participating with the Idaho Department of Water Resources to formulate comprehensive plans for conservation, development, management, and use of water within several of the State's major river basins where Reclamation has projects and where competing water uses are strongly evident.

**Josephine County Water Management Improvement, Oregon.** This area is in transition from agriculture to suburban and urban uses. The study is identifying the types of water supply and service needs that will exist into the future and modifications in water supply allocations and delivery facilities that will be needed. In addition, the study is finding implementable solutions to salmon passage problems at Savage Rapids Dam.

**Minidoka North Side Pumping Division, Drainwater Management, Idaho.** This study is addressing alternatives to the present practice of disposing of irrigation return flows through ground-water injection wells. Solutions that are being explored include encouraging conversion to sprinkler application, management and operational changes to improve drainwater quality, drainwater reuse to reduce volumes of injected water, and construction of drains to divert wastewater to ponding areas or to the Snake River.

**Upper Deschutes River Basin Water Conservation Project, Oregon.** This study is evaluating measures to improve water conveyance and onfarm irrigation efficiencies associated with Reclamation projects, with the objective of dedicating part of the saved water for streamflow restoration to meet multiple purposes. Demonstration projects are being implemented in partnership with the irrigation districts and canal lining materials suppliers.

**Upper John Day Water Optimization Project, Oregon.** This study is evaluating the potential for conjunctive surface and ground-water use including watershed retention and small storage facilities to control runoff, reduce seasonal water shortages, and stabilize ground-water conditions in the basin. Five subbasins are being studied in which small water conservation and stream restoration programs will be developed.

**Upper Snake River Basin Storage Optimization, Idaho-Wyoming.** Reclamation is cooperating with the State of Idaho and others to gather

and analyze the information required to implement the Swan Falls agreement and to develop an improved water management plan for the basin. The study is addressing a number of options for optimizing the operation of Reclamation and non-Federal water regulation facilities in the upper Snake River basin to meet the many competing demands placed on this water source.

**Willamette River Basin Water Optimization, Oregon.** Reclamation is working with the State to identify institutional and statutory constraints associated with promoting optimal use of existing supplies. Management plans, including conservation and optimization of water operations, would be developed for incorporation in State water resources strategy.

**Yakima River Basin Water Enhancement Project, Washington.** This study is directed at on- and off-reservation water problems and development opportunities. In phase 1, the focus was on fish passage and protective facilities which have generally been constructed. The focus in phase 2 has been on water supply with the emphasis primarily on conservation and other nonstorage measures.

**Lower Gunnison Basin Unit, Colorado.** Reclamation completed an advance planning report on the winter water feature of this salinity control project and studied alternatives to reduce the cost of lining canals and laterals through cost sharing, joint use, and private construction.

**Upper Gunnison Basin Project, Colorado.** This study developed a Gunnison River computer model to evaluate water resources management alternatives.

**Uinta Basin Unit, Utah.** This study evaluated alternative methods of salinity control through land management.

**Sevier River Management Study, Utah.** Reclamation developed a data collection system to provide timely and accurate water resource data for more effective management of the Sevier River basin.

**Wasatch Front Total Water Management Study, Utah.** This study identified opportunities for assisting water organizations to more efficiently use available water resources.

**Alamogordo Water Supply Study, New Mexico.** This study evaluated short- and long-term multipurpose water supply needs for the city of Alamogordo, analyzed the capability of existing facilities to meet those needs, investigated potential sources of water, and formulated alternative plans.

**Glenwood-Dotsero Springs Unit, Colorado.** Reclamation evaluated cogeneration/desalination by private industry as an alternative form of salinity control.

**New Mexico Regional Water Resources Study, New Mexico.** This study updated the 1976 report "New Mexico Water Resources Assessment for Planning Purposes" including: population and employment projections, water use and demand, water shortages, alternative supplies, water augmentation, and most efficient use of water.

**Utah Area Water Demand Model, Utah.** This study developed a computer management tool to forecast changing municipal and industrial water demands, evaluate water conservation strategies, and develop drought contingency plans.

**Non-Point Source Control of Salinity, Upper Colorado Basin.** Reclamation developed and evaluated alternatives for rangeland management to control salinity.

**Special Report on the South Platte-Frenchman Project, Colorado-Nebraska.** A study was completed to evaluate possible solutions for the ground-water overdrafts and streamflow depletions which have occurred in the Frenchman Creek drainage area in northeastern Colorado and southwestern Nebraska. The study identified a number of technical and institutional issues and concerns which would have to be resolved to formulate a viable, acceptable plan to forward to Congress for authorization.



**Review of Operations of the Fryingpan-Arkansas Project, Colorado.** A study was completed reviewing and evaluating the operating criteria for the project to determine what changes could be implemented to benefit the district and Reclamation.

**South Platte River Operations Study, Colorado.** A study was initiated to review possibilities for increased watershed yield through improved water management, and evaluation of physical, economic, social, and political aspects of water management.

**Kansas River Basin Water Operations Study, Kansas.** A study was completed to develop a reservoir management scheme for the principal reservoirs in the Kansas River basin. Implementation of a management scheme will provide water users a more dependable supply of water.

**Special Report Summarizing the Milk River Water Supply Study, Montana.** This study developed a preferred plan having a combination of water conservation, improved water management, and increased water supply to deal with severe water shortages in the Milk River basin.

**Cherry Creek Project Report, Montana.** A technical analysis of a dam, reservoir, and spillway in eastern Montana for wildlife and recreational purposes was completed. Work was done for the Bureau of Land Management (BLM) on a reimbursable basis. BLM published the report.

**Preliminary Findings Memorandum - Yellowtail Afterbay Dam Water Quality, Montana.** This study determined that there are viable alternatives to solve the gas supersaturation problem that exists below Yellowtail Afterbay Dam. The report recommended further study, leading to seeking authorization for the selected alternative to deal with gas supersaturation problem. Plan formulation is underway.

**Special Report on Tongue River Dam Rehabilitation Study, Montana.** A study was initiated to evaluate rehabilitation alternatives for the replacement of Tongue River Dam Spillway, enlargement of the reservoir, and wildlife enhancement through wetlands development. The study is a joint effort between the State, Northern Cheyenne Tribe, and

Reclamation. The increased storage would contribute toward satisfying the reserved water rights of the tribe. The report will be completed in FY92.

**Planning Report/Draft Environmental Statement on the Prairie Bend Unit, Nebraska.** This study analyzed alternatives with the purposes of recharging ground-water aquifers to stabilize ground-water levels, managing fish and wildlife habitat for threatened and endangered species and other migratory birds, and assisting in the conservation and recovery of threatened and endangered species.

**Special Report on Tri-State/Northport Canal Regulating Facility, Wyoming.** Prepared under Disaster Assistance Act of 1988, the study identified feasible alternative plans for construction and operation of a small canal-side reservoir to regulate flows from the Tri-State Canal in the head of the Northport Canal which would reduce water management, control, and accounting problems. Facility would also benefit wildlife through creation of a quality permanent wetland.

**Ground-Water Assessment of the East Central and Southeast Oklahoma Water Supply Study Areas, Oklahoma.** Reclamation prepared a reconnaissance level assessment of the development potential of ground water in the study area. Preliminary assessment concluded that ground-water resources are insufficient or are too low in quality to meet the water demands in the majority of the study area.

**Special Study on Kiamichi Hydropower Study, Oklahoma.** Reclamation completed a background study on 54 Reclamation and 7 Corps of Engineers' sites for hydropower development. Only one single purpose site was found to be justifiable for power development, and only 31 showed potential under multipurpose development.

**Special Study on Southeast Oklahoma Water Supply, Oklahoma.** This report presented the results of investigations on a proposed supply and distribution system for delivery of water to communities and water districts in southeast Oklahoma.

**Hydrologic Investigation of the Blue River Basin, Oklahoma.** This report provided a compilation of hydrologic information for use by

the Oklahoma Water Resources Board in determining the stream water available within the basin for further appropriation and use.

**Field Draft Planning Report/Environmental Assessment on the Marty II Unit, South Dakota.** This report analyzed alternatives to sprinkler irrigate approximately 2,900 acres on the Yankton Sioux Reservation in South Dakota. Neither of the development alternatives was selected because of the question of Marty II Unit's potential effects on water quality of the area, and no further work is anticipated until this issue can be answered.

**Rapid Valley Water Management Study, South Dakota.** This study developed and evaluated 11 alternatives to conserve or augment the water supply in Rapid Valley.

**Texas Big Sandy Study, Texas.** This study focused on the firm yield on the proposed Lower Big Sandy Creek Reservoir and the capability of the firm yield to meet the water supply needs of a specified demand center.

**Bexar-Medina-Atascosa Water Supply Availability Assessment, Texas.** This is a technical assistance effort, at the request of the Texas Water Development Board, which evaluates storage and irrigation facilities, wetlands, geohydrology, and operation and maintenance measures for the Bexar-Medina-Atascosa Counties Water Control Improvement District No. 1. The study is for the purpose of identifying potential availability of water through conservation to replace M&I demand on the Edwards Aquifer.

**Seminole Dam Special Report, Wyoming.** This study analyzed, at an appraisal level, the additional yield available in Seminole Reservoir by raising the dam. Three alternatives, including no action, were analyzed.

No recommendations or conclusions were provided. Should Wyoming decide to pursue one of the action alternatives, further studies would be required.

**Wind River Basin Water Supply Study, Wyoming.** Reclamation initiated a cooperative study with the Shoshone-Arapahoe Tribes and the State to identify opportunities for conservation and improved water

management basin wide to meet the demands of current users in view of the tribe's reserved water rights settlement.

*Reclamation's design program continued to support ongoing construction program efforts; but Reclamation engineers also were involved in developing specialized designs for such diverse purposes as desalting water, fish protection, public recreation, cleanup of environmentally contaminated sites, and water resources project designs for other agencies and foreign countries.*

*Reclamation continued the policy of committing resources to complete projects under construction. Major project construction activities include:*

**Central Arizona Project.** Construction continued on the aqueduct system to supply central Arizona with supplemental water from the Colorado River and improve water management within the State. The Hayden-Rhodes and Salt-Gila Aqueducts were completed and put into operation, and the majority of the work on the Non-Indian Distribution System was completed. All major contracts for the Tucson Aqueduct were awarded, modification work at Roosevelt Dam continued, major contracts for New Waddell Dam were awarded, and repair work began on the six siphons on the Hayden-Rhodes Aqueduct. At the end of FY91, the Central Arizona Project was 72 percent complete (including safety of dams, Navajo Generating Station scrubbers, and repairs to siphons).

**Central Utah Project, Bonneville Unit.** Reclamation completed most of the work on Jordanelle Dam and the Syar Tunnel and began mitigation work for Jordanelle Dam by replacing wetlands which will be inundated by the reservoir. Reclamation initiated work on the Sixth Water Aqueduct and began preconstruction activities for the Upper Diamond Fork Pipeline. The Central Utah Project will move water within the State of Utah to meet supplemental water needs and improve water management within the State. At the end of FY91, the Bonneville Unit was 70 percent complete as currently authorized.

**Safety of Dams Program.** Major structural modifications for safety of dams purposes were completed at Jackson Lake Dam and Fontenelle Dam, Wyoming; and Caballo Dam and Navajo

Dam, New Mexico. At each of these dams, modifications used state-of-the-art technology and construction techniques to ensure the stability of the dam embankment. Major modification work was initiated at Deer Flat Dam, Idaho; Mormon Island Dam and Folsom Dam, California; Stewart Mountain, Bartlett, Horseshoe, and Roosevelt Dams, Arizona; and on the Bureau of Indian Affairs' Coolidge Dam, Arizona.

**Columbia Basin Project.** This project provides a 6.5-million-kilowatt power supply and irrigates 1 million acres in central Washington. Reclamation continued land acquisition and preconstruction activities for installing additional irrigation drainage. At Grand Coulee Dam, Reclamation upgraded transformers, installed fire protection features, and completed a new engineering building.

**Dolores Project.** This multipurpose project in southwestern Colorado will provide hydropower, irrigation and municipal and industrial water supplies, recreation, fish and wildlife enhancement, and flood control. Reclamation completed most of the work on McPhee Dam and Powerplant and initiated work on distribution system. At the end of FY91, the project was 79 percent complete.

**Animas-LaPlata Project, Colorado/New Mexico.** Reclamation reached an agreement with four tribes, three States, water users, and fish and wildlife interests to protect endangered fishes and uphold trust responsibilities to meet the water rights of the Mountain Ute and Southern Ute Tribes. Reclamation worked with Fish and Wildlife Service and project beneficiaries to resolve the issue of potential project impacts on the Colorado squawfish and razorback sucker, had a groundbreaking ceremony in 1991, and initiated preconstruction activities. When completed, the multipurpose project will provide municipal, industrial, and irrigation water for both Indian and non-Indian water users, as well as recreation and fish and wildlife benefits.

**Colorado River Basin Salinity Control Project - Title I.** The Yuma Desalting Plant was completed in 1991 and will go into operation in 1992 to help the United States meet its treaty

obligations for providing water to Mexico that meets salinity standards. Work continued on appurtenant features. At the end of FY91, the project was 89 percent complete.

**Colorado River Basin Salinity Control Project - Title II.**

Title II projects are designed to reduce the salt loading of the Colorado River. Reclamation completed construction of the 15,500-foot deep brine injection test well and 4-mile pipeline, Paradox Valley Unit, Colorado. The Paradox Valley Unit was 66 percent complete at the end of FY91. Reclamation initiated land acquisition and preconstruction activities on Grand Valley Unit, Colorado, (30 percent complete) and Lower Gunnison Basin Unit, Colorado (2 percent complete). Reclamation initiated discussions with the Las Vegas Valley Water District on a cost-shared feasibility study of the Lower Virgin River Unit.

**San Luis Valley Project, Closed Basin Division, Colorado.**

Work progressed on installing wells and laterals to salvage ground water from the Closed basin. The project was 85 percent complete at end of FY91 and is scheduled to be completed in FY93.

**West Extension Irrigation District Canal, Umatilla Basin**

**Project, Oregon.** Construction progressed on various features. The project will provide water exchange facilities to improve Umatilla River streamflows for fish migration while maintaining a water supply at this existing irrigation project. The work consists of constructing 1-3/4 miles of concrete-lined canal, a regulating reservoir, and a pumping plant; and installing 72- and 60-inch-diameter pipeline and associated railroad and highway siphons and concrete structures. At the end of FY91, about 28 percent of the work was completed.

**Umatilla Basin Project.** Design of additional facilities continued with construction anticipated to continue. Reclamation initiated development of Memorandum of Agreements among Reclamation, the State of Oregon, the Confederated Tribes of the Umatilla Indian Reservation, major irrigation districts, Bonneville Power Administration, WaterWatch of Oregon, Oregon Trout Unlimited, et al., supporting the water right application for the

Columbia River Pumping Plant. This plant, a key feature of the project, will become a model for restoring depleted salmon runs to rivers of the Columbia River Basin. The total share of Reclamation costs is anticipated to amount to \$51.5 million.

**Garrison Diversion Project, Pick-Sloan Missouri Basin (PSMB) Program, North Dakota.** Reclamation completed and initiated use of 14 of the 37 municipal, rural, and industrial water supply projects authorized under the Garrison Reformulation Act. Phase I of the Southwest Pipeline Project consisting of 80 miles of transmission line to deliver Missouri River water to Dickinson, North Dakota, was completed. Preconstruction and some construction activities continued on other project facilities, and agreement was reached with the Administration on future funding levels that will permit the reformulated project to proceed towards completion. At the end of FY91, the project was 35 percent complete.

**Buffalo Bill Dam Modifications, PSMB, Wyoming.** Work on raising the dam 25 feet to increase storage and modifying the spillway was completed in FY91. The modification will increase storage capacity by 250,000 acre-feet and add 18 megawatts of hydropower generating capacity. Construction of the Spirit Mountain Powerplant and the recreation facilities was initiated, with completion scheduled for FY93.

**North Loup Division, PSMB.** Project will provide irrigation, recreation, and fish and wildlife benefits to central Nebraska. Major construction on Davis Creek Dam was completed in FY91, and construction of diversion works, pumping plants, canals and laterals continued. At the end of FY91, the project was 86 percent complete.

**Belle Fourche Unit, PSMB, South Dakota.** Reclamation completed Belle Fourche Diversion Dam and continued work on canals and laterals as part of the modernization and improvement of the original 1914 project. Work was 52 percent complete at the end of FY91.

**Leadville Treatment Plant, Colorado.** Reclamation completed construction of the plant to remove heavy metals from mine drainage polluting the Arkansas River.

**Central Valley Project, California.** Construction of Buckhorn Dam, a "fish friendly" facility designed to keep sediment out of the Trinity River, was completed.

**Boulder Canyon Project, Arizona/Nevada, Visitor's Facility Improvements.** Work was initiated on the Hoover Dam Visitor's Center, and the highway realignment work was completed. At the end of FY91, the facility improvement project was 47 percent complete, with completion expected in FY94.

**Headgate Rock Hydroelectric Project, Arizona.** Work progressed on this project, which consists of installing a powerplant with three run-of-the-river turbine generating units at the existing dam to provide power for the Colorado River Indian Reservation. At the end of FY91, the project was nearly 90 percent complete, with operations scheduled to begin in FY92.

**All-American and Coachella Canals, California.** Reclamation issued a draft environmental impact statement on lining a 23-mile section of the All-American Canal and initiated environmental studies for lining a 35-mile section of the Coachella Canal.

**Dallas Creek Project, Colorado.** Construction was completed on Ridgway Dam to increase usable water supply for irrigation and municipal and industrial uses in west-central Colorado. Project will also provide recreation development and improved wildlife habitat.

**Oroville-Tonasket Unit, Chief Joseph Dam Project, Washington.** Reclamation completed construction work consisting of replacing the badly deteriorated irrigation distribution system which provides a full water supply to about 10,000 acres.



**McGee Creek Project, Oklahoma.** Reclamation completed construction to provide municipal and industrial water to Oklahoma City.

**San Felipe Division, Central Valley Project, California.** Reclamation completed construction to provide supplemental water to 44,900 acres and 135,400 acre-feet of municipal and industrial water annually to the Santa Clara Valley.

*High Plains States Groundwater Recharge Demonstration Program. In 1989, Reclamation initiated Phase II, the construction, monitoring, and evaluation of the 21 projects authorized under Public Law 98-434. The purpose of the program is to study the potential for artificial ground-water recharge and to demonstrate recharge technologies under a variety of hydrogeologic conditions.*

Construction was completed on six projects which are now in operation:

- > Turner-Hogeland, Montana
- > York, Nebraska
- > Washoe, Nevada
- > Hueco Bolsom, Texas
- > Southeast Salt Lake County, Utah
- > Highline Well Field, Washington

Construction was initiated on seven projects:

- > Rillito Creek, Arizona
- > Denver Basin, Colorado
- > Southwest Irrigation District, Idaho
- > Wood River, Nebraska
- > Blaine Gypsum, Oklahoma
- > Hermiston, Oregon
- > Huron, South Dakota

Feasibility studies have been completed on three projects, but construction cannot start unless Congress increases the authorized \$20 million appropriations ceiling:

- > Equus Beds, Kansas
- > Big Creek Water Banking, Kansas
- > Woodward, Oklahoma

Three studies have been deferred pending an appropriations ceiling increase:

- > Arcade, California
- > Stockton East, California
- > Texas High Plains, Texas

Proposed studies for Arikaree and Frenchman, Colorado, have been withdrawn due to lack of cost sharing and have not yet been replaced. A cooperative agreement was executed with the Western States Water Council for a study of the economic and institutional aspects of the impact of ground-water recharge, and a grant was executed with the Water Science and Technology Board to study and report on the use of wastewater and urban runoff for ground-water recharge.

*Other activities included:*

Reclamation signed a Record of Decision recommending that development of the **AB Lateral Hydropower Facility near Montrose, Colorado**, proceed on the condition that certain environmental requirements are met. This 43-megawatt-capacity hydroelectric powerplant would be privately financed and operated by Montrose Partners and the Uncompahgre Valley Water Users Association. It would divert water from the Gunnison River through the existing Gunnison Tunnel, with discharge from the powerplant into the Uncompahgre River.

## Energy

*Goal: To ensure that Reclamation projects effectively contribute to meeting the energy needs of the Nation.*

*Important accomplishments included the following:*

As the Nation's 11th largest producer of electric power, Reclamation developed an energy initiative, "**Hydropower 2002**," to help the Nation

meet its present and future energy needs in an environmentally acceptable manner through improvements in the operation and management of Reclamation's hydropower projects. The initiative will be accomplished through the implementation of six strategies: (1) efficiency and operational improvements, (2) conservation, (3) addition of generating resources, (4) research and development, (5) financing and cost recovery, and (6) ensuring the environmental capability of Reclamation's hydropower facilities. **"Hydropower 2002"** will serve as the Implementation Plan for the "Energy" element of the Strategic Plan.

Reclamation began **uprating existing powerplants** in 1978. In FY89-91, uprates were completed at Flatiron, Fremont Canyon, and Keswick Powerplants. Uprates were initiated at Hungry Horse, Palisades, and Minidoka Powerplants. When completed in the next several years, the uprate program will have increased Reclamation's total generating capacity by about 2,000 megawatts, an increase of 15 percent.

Nine generating units at **Hoover Dam** have been **uprated**, increasing generating capacity by 372.5 megawatts. Uprating was accomplished using non-Federal funds.

**Uprating** of the Flaming Gorge Dam Powerplant generating units was initiated in FY90. The uprate will be completed in FY92, increasing plant capacity from 108 megawatts to 151 megawatts. Uprating at Blue Mesa Dam Powerplant began in FY91.

The penstock of the **Pilot Butte Powerplant, Wyoming**, was restored and the plant was returned to service.

**Excitation system field tests** at Reclamation facilities to improve unit operation and power system reliability were initiated.

Reclamation completed the **Casper Control Center, Wyoming**, to improve hydropower operations on the North Platte River and tied in Yellowtail Powerplant operations to the Center.

## Investing in Rural America

*Goal: To assist in providing safe and reliable water supplies for rural America consistent with the Clean Water Act and the Safe Drinking Water Act.*

*Key Reclamation activities included:*

Reclamation began development of **wellhead water treatment systems** for marginally impaired ground waters to enhance water quality for small communities and Indian reservations.

Reclamation established the position of Director, Native American Affairs, and through that office participated in departmental efforts to **settle Indian water rights claims** by providing members, technical support, and chairpersons for negotiating and implementation teams. Implementation of settlements was initiated or continued for the following:

- Paiute-Shoshone Tribes of the Fallon Reservation
- Shoshone-Bannock Tribes of the Fort Hall Reservation
- La Jolla, Rincon, Pauma, and Pala Bands of Luiseno Mission Indians and the San Pasqual Band of Digueno Mission Indians (San Luis Rey Settlement Act)
- Tohono O'odham Nation (Southern Arizona Water Rights Settlement Act)
- Salt River Pima-Maricopa Indian Community
- Yavapai Indians of the Fort McDowell Mohave-Apache Indian Community

Negotiations were initiated or continued for the following:

- San Carlos Apache Tribe
- Pima-Maricopa Tribes that form the Gila River Indian Community
- Northern Cheyenne Tribe
- Jicarilla Apache Tribe
- Assiniboine and Gros Ventre Tribes of the Fort Belknap Reservation
- Blackfeet Tribe

- Warm Springs, Wasco Chinookan, and Paiute Tribes of the Warm Springs Reservation
- Paiute-Shoshone Tribes of the Duck Valley Reservation
- Taos Pueblo Tribe
- Chippewa Cree Tribe of the Rocky Boy's Reservation

The **WEB Rural Water Development Project in South Dakota** was completed. This project will supply water from Lake Oahe for domestic use to the rural residents and towns in a service area covering 5,200 square miles in north-central South Dakota.

Reclamation provided **engineering oversight expertise** for 40 municipal, rural, and industrial water supply projects under the **Garrison Reformulation Act**. This has assisted 37 communities throughout North Dakota and the Devils Lake Sioux, Standing Rock Sioux, Mandan, Arikara, and Hidatsa Indian Tribes on three reservations.

Reclamation provided oversight and coordination to the tribal and non-tribal entities as they prepared the Needs Assessments for the on-reservation and off-reservation portions of the **Mni Wiconi Project, South Dakota**.

Reclamation initiated design work on the **Central Arizona Project (CAP) Salt River Pima-Maricopa Indian Community Distribution System**. This work is part of the Salt River Pima-Maricopa Indian Water Rights Settlement Act.

Delivery of 75,000 acre-feet annually of Colorado River water continued through the CAP system to the **Ak Chin Indian Community**. This water is part of the Ak Chin Indian Settlement Act.

Negotiations of the exchange agreements were completed to allow construction of the **Lower Colorado River Water Supply Project** to begin in FY92. This project will furnish water to the city of Needles, California.

## Land Resources

*Goal: To manage, in partnership with others, federally-owned Reclamation project lands to provide the widest range of benefits.*

*Reclamation activities included the following:*

Development of **resource management plans** for Reclamation lands, stressing a balance of resource development, public recreation, and protection of natural and cultural resources and environmental values was initiated. The first resource management plan in Reclamation was completed in FY90 for Cascade Reservoir, Idaho.

Reclamation continued **review of withdrawn lands** and made recommendations to BLM on lands to be revoked and lands to be retained.

Reclamation negotiated an agreement with BLM to curate the extensive **archeological** collection, data, and documents that were recovered or generated as a result of construction of the **Central Arizona Project**.

In December of 1990, the Implementation Oversight Committee met for the first time to define its purpose in the **Pilot Test Area (PTA) of the Interim Interagency Agreement between Reclamation and BLM**. Accomplishments in FY91 include a Memorandum of Understanding between Reclamation and BLM for the withdrawn and acquired lands in the Yuma District remaining after the completion of the withdrawal review, 90 percent completion of the withdrawal review along the Colorado River, and 100 percent completion of the withdrawal review of the Imperial and Coachella Valleys, California.

An agreement was initiated with the Bureau of Indian Affairs, National Park Service, and the Colville Confederated and Spokane Tribes for **cooperative management of public lands around Lake Roosevelt behind Grand Coulee Dam**.

## **Recreation**

*Goal: To support and enhance compatible recreational opportunities on federally-owned Reclamation project lands and water surface areas.*

*Public use facilities at 300 recreation areas on Reclamation projects attracted nearly 80 million visitors each year. Specific Reclamation activities during fiscal years 1989, 1990, and 1991 included:*

Reclamation supported the **Secretary's Enjoy Outdoors America** program that established enhanced recreational opportunities on public lands. Reclamation focused on improving the condition and capacity of project recreational facilities, providing appropriate access to the physically disadvantaged, and balancing project operations with recreational opportunities.

Reclamation continued to pursue **accessibility to outdoor recreation opportunities for the physically challenged** by building partnerships with local and State Governments and private organizations including P.A.W. (**Physically-challenged Access to the Woods**).

Reclamation received a Special Recognition Award from P.A.W for developing the **Planning for Accessibility Handbook** which is now used by all levels of government for planning and implementing accessibility programs.

Reclamation dedicated **Ridgway State Recreation Area**, a joint Reclamation/State recreational partnership, which received a P.A.W. award for excellence for one of the finest accessible facilities in the West.

Development of the **Accessibility Data Management System (ADMS)**, an automated system to catalog accessible recreation opportunities throughout the Federal Government, was initiated. The Pacific Northwest Region is directing ADMS development in conjunction with all Federal providers of outdoor recreation. P.A.W. will use this system to create P.A.W. TRACS (**The Recreation Accessibility Call System**) to provide free assistance to the public in identifying outdoor recreation opportunities across the country.

**Recreation facilities enhancements** on 17 projects in the Great Plains Region were completed, including accessibility for the physically disadvantaged, campgrounds, restrooms, access roads and parking areas, boat-launching ramps, and fishing access.

In cooperation with the U.S. Forest Service, Reclamation initiated development of a \$41.4-million **expansion of recreation facilities** to include almost 2,000 new campsites at Roosevelt Lake, Arizona.

The Pacific Northwest Region, in partnership with several local groups, completed phase I and initiated phase II development at **Walcott Park, Minidoka Project, Idaho**. Improvements include restrooms, water system, wastewater treatment system, boat ramp, and trails.

Reclamation participated with other Interior agencies in implementing the **Watchable Wildlife Initiative** which establishes wildlife viewing areas on public lands.

Construction of **New Waddell Dam** will significantly increase the size of the existing Lake Pleasant. In addition to contributing resources to help meet Arizona's water supply needs, balanced multiple use management at this facility will provide additional water area for recreation, new boat ramps, an expanded fishery, an additional 450 picnic sites and 225 campsites, and a protected area for wildlife.

Reclamation initiated **final design and construction activities** at several recreation sites in the Pacific Northwest Region:

- Boulder Creek, Black Canyon, Wild Rose, Buttercup, and VanWyck campgrounds (**Boise Project, Idaho**)
- Phase 2 and 3 for Walcott Centennial Park and expanded visitor access and facilities at Jackson Lake (**Minidoka Project, Idaho-Wyoming**)
- **Visitor access improvements** at Grand Coulee Visitor Center and new health and safety facilities at Scootenay Park (Columbia Basin Project, Washington). Several modifications to office buildings and parking areas will allow access to persons with disabilities. The offices include Minidoka Project Office (Burley, Idaho); Central Snake Projects Office (Boise, Idaho); Yakima Project Office (Yakima, Washington); Grand Coulee Engineering and Administration buildings (Grand Coulee); and Columbia Basin Project Office (Ephrata, Washington). The new Regional Soil and Water Laboratory, under construction in Boise, Idaho, was designed using accessibility guidelines.



## Research and Technology Transfer

*Goal: To conduct research and encourage technology transfer to improve resources management, development, and protection.*

*Reclamation established the Global Climate Change Response Program and entered into agreements with the Environmental Protection Agency and the Geological Survey to study the potential impacts of global climate change on water resources in the 17 Western States. Specific activities include:*

Research projects were initiated to determine the potential impacts of **global climate change** on the Gunnison River basin in Colorado and the Carson, Truckee, and American River basins in California.

Reclamation initiated research on the potential changes in **pre-precipitation patterns** in the Western United States and the effects of climatic change on aquatic weeds and fishery resources in Reclamation reservoirs.

Research was completed on the impacts of climate change on the **Central Valley Project**, a major water supply and delivery system in California.

Reclamation completed an examination of **past temperature and precipitation relationships** in the Oklahoma-Texas area.

Reclamation provided support to the Geological Survey on **mesoscale precipitation modeling** in the Delaware River basin, and supported the Environmental Protection Agency on a climate sensitivity analysis of the Colorado River Basin.

*Through the Water Technology and Environmental Research program, Reclamation pursued studies in environmental restoration and enhancement, water supply alternatives, resource optimization, new methods and materials, and power systems. Research study results include:*

A new **process for removing nitrates** from water was discovered and patented.

Reclamation developed an **improved optimization scheme** that could improve hydropower generation efficiency by 2 percent, resulting in additional hydropower worth millions of dollars without requiring additional water.

Reclamation **developed design data** for using roller-compacted concrete steps to protect the downstream face of embankments from erosion due to overtopping. Use of this new method will save the United States millions of dollars when compared with traditional remedies.

A **digital power system stabilizer** that will enhance the stability of interconnected power systems and help prevent extremely costly blackouts and brownouts was tested.

Reclamation obtained two patents for **water treatment processes** that remove or destroy major contaminants in agricultural drainage waters.

Reclamation developed **new testing methods for construction control** of soil-cement and roller-compacted concrete. Use of these methods has reduced the need for laboratory personnel to be involved in daily construction control, with attendant savings.

*Other activities included:*

In response to a congressional request, Reclamation prepared a report entitled "**A Plan for Improving Desalination and Water Treatment Technologies**" and sent it to Congress in February 1990. The report provides a general plan for a public/private sector cooperative program of desalination technology development, building on the expertise that exists in Reclamation. Research would focus on developing inexpensive means of desalting and treatment of other water quality problems. Congressional legislation was introduced consistent with the general plan for technological development, outlined in the report.

Reclamation sponsored a **seminar on Desalting Research and Development Needs**, which was attended by the worldwide desalting community. Results of the seminar are being published

and distributed throughout the industry. Reclamation initiated research and development work on determining the causes of premature cellulose acetate membrane failures. These failures have long plagued the industry in various worldwide locations. Reclamation held a series of workshops that led to an understanding of some of the causes of failures for the first time.

Reclamation initiated a formal **technology transfer program** to share research results with other agencies and the private sector and to encourage development of new research partnerships.

In cooperation with the private sector, a **system to automate the monitoring of generator temperatures** to protect power generation facilities in the Lower Colorado Region was developed. The system has been transferred to the private sector and has already been incorporated at several nongovernment facilities.

Reclamation conducted several **model research studies** to develop and verify the hydraulic performance of new and/or replacement structures. An example is the Minidoka Replacement Powerplant, where the overall benefit-cost ratio of the \$62,000-model study is estimated at 13:1.

Reclamation transferred the **Grand Coulee Third Powerplant model turbine facility** to Colorado State University for cooperative research, development, and education.

Reclamation entered into a \$420,000, 5-year cooperative agreement with Colorado State University to allow its staff and graduate students to assist in the **hydraulic research test program for overtopping embankment dams**.

A cooperative research and development program with Woodward Governor Company began to create an **advanced digital governor for hydroelectric generators**. The intent is to enhance powerplant performance and response to dynamic system conditions.

Reclamation entered into a collaborative \$1,200,000, 4-year joint research project with the Fish and Wildlife Service entitled **"Development of Applied Methods for Determining Flushing Flows for Spawning Gravels."** Funding for this research is being contributed equally by Reclamation and the Fish and Wildlife Service.

Reclamation entered into a \$130,000, 3-year cooperative research and development agreement with the Electric Power Research Institute for a **study on overtopping dams.**

Reclamation signed a \$150,000, 2-year cooperative research and development agreement with the American Water Works Association Research Foundation to **study causes and remedies for failures of prestressed concrete pipe.**

Reclamation entered into a multi-year cooperative research and development master agreement with Pacific Gas and Electric Company (PG&E) to **conduct joint hydroelectric power research.** PG&E provided \$95,000 to fund studies on a stratified reservoir flow model for the Pratville Intake at Lake Almanor, California.

## PROTECTING THE ENVIRONMENT

Reclamation's increased emphasis on improved management and protection of resources is reflective of greater environmental knowledge, changing societal values and needs, and the natural evolution from a resource development focus. Reclamation projects can be planned, designed, constructed, and operated to preserve and enhance environmental resources while still meeting water and power supply needs.

Project operations and management strategies now stress the appropriate balancing of all uses, including meeting water quality objectives, controlling point and nonpoint sources of pollution, providing for instream flows, and conserving and enhancing fish and wildlife habitat and resources.

Reclamation activities are supporting the national goal of no overall net loss of wetlands, and we are using our engineering and scientific expertise to assist other entities in efforts to protect and enhance wetlands and riparian habitat. The value of wetlands includes their inherent ability to provide flood control, water storage, ground-water recharge, and water quality improvement, in addition to their value for fish and wildlife purposes.



*Canals and other project facilities provide attractive habitat for fish and wildlife. Economic and environmental benefits are not mutually exclusive and need to be formulated together to ensure the future economic and environmental health of the Nation.*

The quality of the Nation's surface and ground water is critical to the public health, economy, and environment. To protect ground and surface water from contamination from hazardous and toxic wastes, Reclamation has sought to ensure that all project-related lands are free of hazardous wastes and has assisted other entities in the cleanup and management of hazardous wastes.

## Fish and Wildlife Resources

*Goal: To develop and manage Reclamation projects and lands to conserve and, where appropriate, to enhance fish and wildlife habitat and populations.*

*Reclamation accomplishments include:*

Reclamation initiated development of "**CAL WATER 2002**," a series of administrative and operational initiatives to address environmental and other issues on Reclamation projects in California. Representative actions will include:

- Contract with the State of California to purchase and install spawning gravels in the upper Sacramento River.
- Improve the water supply for Nimbus Fish Hatchery.
- Contract for a firm water supply to wildlife refuges in the Central Valley.
- Establish Water Conservation and Advisory Centers in Mid-Pacific and Lower Colorado Regional Offices.
- Construct a 23-mile concrete-lined replacement canal for the All-American Canal to conserve 68,000 acre-feet of water each year.
- Initiate a demonstration cost-sharing program with non-Federal diverters to remedy the existing fish screen effectiveness of pump and direct water diversion facilities on the Sacramento and San Joaquin Rivers and in the Delta.
- Study the proposal to increase the water supply from the Trinity and Sacramento River systems by storing surplus Sacramento River flows in an enlarged Clair Engle Reservoir on the Trinity River.

- Construct the Lower Colorado Water Supply Project to supply water to the city of Needles and other California nonagriculture users along the Colorado River.
- Study conjunctive use potentials for concurrent surface and ground-water use.
- Study proposed structural and nonstructural alternatives for supplying optimum level of water to wildlife refuges.
- Initiate challenge cost-sharing programs to improve applied technology and technology transfer with respect to water conservation and drainage management.

Activities for recovering and managing **endangered species** associated with Reclamation projects were pursued as follows:

- Completed a \$15 million fish-screening facility at the **Red Bluff Diversion Dam** on the Sacramento River in California.
- Completed a major **bald eagle ecology study** in response to the Endangered Species Act for the Central Arizona Project.
- Completed consultation and implemented actions under the Endangered Species Act for the **Lost River sucker and the long-nose sucker** in the Klamath River, Oregon and California.
- Operated Central Valley Project facilities for protection of the **winter-run chinook salmon** in the Sacramento River by releasing cool water during the summer months through Shasta Dam's lower outlet works, bypassing the powerplant.
- Completed **Shasta Outflow Temperature Control Planning Report/Final Environmental Impact Statement**. The device will provide greater control over the temperature of releases, with the goal of providing optimum cold water releases for the salmon runs.

- Continued the program to recover and restore the **razorback sucker**, an endangered species on the Colorado River (Lake Mojave, Arizona).
- Initiated a **cooperative research and development project at Heart Butte Reservoir** with the State of North Dakota, Fish and Wildlife Service, Environmental Protection Agency, Soil Conservation Service, and Ducks Unlimited. This project will control nonpoint source runoff through the use of wetlands and other "best management" practices within the watershed.
- As an outgrowth of the **Animas-La Plata Project** section 7 consultation, began a 7-year research study for implementation of the recovery of endangered fish in the San Juan River (Colorado, New Mexico, and Utah).
- In FY91, participated and cooperated in the "**Salmon Summit**" with other Federal, State, Native American, fishery, hydropower, and irrigation interests to develop and implement a management plan to benefit salmon in the Columbia River basin.
- Completed fish ladders and screens on the first phase of the **Yakima Fish Passage and Protective Facilities** which included facilities at 15 sites in Washington. Initiated second phase for screens and/or fish ladders at an additional 60 sites in the Yakima basin with funding from Bonneville Power Administration.
- Entered the fourth year of implementation on the **Colorado River Endangered Fish Recovery Program**. Keystone of the program is an annual \$2.3-million budget which comes from participating states (Utah, Wyoming, Colorado), appropriated Federal funds, and revenues from the generation of power at Colorado River Storage Project facilities. Significant progress has been made in research, habitat management, and determination of instream flow needs for the endangered fish.
- In October 1990, initiated a 5-year evaluation in the North Platte River Projects Office to determine the impact of



operation of facilities in the **Platte River basin on endangered species**. A report on the effects of North Platte operations will be completed in FY93, and a report on the South Platte in FY95.

- In April 1991, initiated a Memorandum of Agreement with BLM to allow the continued development of **fish and wildlife reservoirs in the Milk River basin** as long as a portion of those reservoirs provides replacement storage to offset impacts and protect the limited irrigation supply.
- Initiated a **Vegetation Management Study** to determine the feasibility of replacing saltcedar with native riparian plants along the lower Colorado River. Replacing the saltcedar with native plants will improve the wildlife habitat and reduce water consumption. Activities to date include surveys of the distribution of saltcedar, examination for replacement with native plants, and review of research on water consumption by riparian vegetation.

Reclamation participated in a Secretarial decision to **establish releases** of 340,000 acre-feet per year **to the Trinity River** in California during the 1992-96 period. These releases will permit completion of the ongoing study by the Fish and Wildlife Service which will determine what flows are needed to protect the long-term needs of the fishery.

Phase 1 and 2 renovations of the **Nimbus Fish Hatchery** on the American River, California, were completed.

Reclamation completed the modernization of the **Trinity Fish Hatchery**, California.

The mitigation requirement was completed by restoring flow of water to **Flume Creek Fish Hatchery** below Fontenelle Dam, Wyoming.

Reclamation initiated a long-term study for the **biocontrol of saltcedar**. The study is being conducted through a cooperative

agreement with the Agricultural Research Service. Saltcedar has displaced desirable vegetation in the Southwest.

## Water Quality

*Goal: To manage resources to protect and provide for safe and reliable water supplies of suitable quality for agricultural, domestic, municipal, industrial, fish and wildlife, and recreational purposes.*

*Major activities include:*

Reclamation participated in **Departmental National Irrigation Water Quality Program (NIWQP)**, a five-phase program to identify and address irrigation-induced water quality problems in the 17 Western States. The phases are:

- First phase was a comprehensive inventory of water quality, bottom sediment, and biological data from over 600 irrigation projects.
- Second phase activities include reconnaissance studies at 26 areas. Published reports are available for 18 areas, and those reports indicated 7 areas had concentrations of trace elements (principally selenium) at levels of concern.
- Phase three of the program involved detailed studies of the source, transport, and fate of the trace elements. Four studies have been completed; three are still ongoing.
- The fourth phase is planning for remediation. Whereas the Geological Survey was the lead agency on phases 1-3, Reclamation is the lead agency on phases 4 and 5. The areas now in phase 4 remediation planning are the Salton Sea, California; the Stillwater National Wildlife Refuge, Nevada; the Middle Green River basin, Utah; and the Kendrick Project, Wyoming.
- The fifth phase is remediation, and there are no areas in this phase yet.

As part of the **Colorado River Water Quality Improvement Program**, Reclamation completed construction of Yuma Desalting Plant, Arizona, and the Paradox Valley Unit, Colorado, and continued construction on the Grand Valley Unit, Colorado. Work was initiated on Lower Gunnison Unit, winter water phase, to reduce salinity return flow to the Gunnison River, a tributary of the Colorado River. Reclamation continued various studies and investigations for a comprehensive, cost-effective program for salinity control in the Colorado River Basin.

Construction was completed on the **Leadville Mine Drainage water treatment plant** for removal of the heavy metal discharge into the Arkansas River, Colorado.

Issues of toxic heavy metals, mineralized soils, mine tunnel discharges, toxic mine/millwaste dumps, nutrients, and eutrophication have been identified and corrective actions and management practices developed and implemented for the **Provo River watershed** in cooperation with the State of Utah. The watershed provides municipal, industrial, and irrigation water to Salt Lake and Utah Counties.

Reclamation developed the **San Joaquin River Basin Management Initiative** to protect the environment and fulfill obligations to water users in the Central Valley of California. The initiative emphasizes fisheries, wetlands, and water quality. Long-term water service contracts are being renewed with the understanding that they are subject to adjustments based on the results of an environmental impact statement that is being prepared.

Reclamation worked with other Interior agencies to conduct a comprehensive evaluation of, and develop a management plan for, agricultural subsurface drainage and related problems on the west-side of the **San Joaquin Valley in California**.

## **Instream Flows**

*Goal: To operate Reclamation facilities to help meet instream flow quantity and quality needs consistent with other project purposes and State law.*

*Major activities include:*

Reclamation conducted research flows and initiated interim operating criteria for Glen Canyon Dam and Powerplant in conjunction with the **Glen Canyon Dam Environmental Impact Statement**. A second round of public involvement efforts were held on the first range of alternatives for the Glen Canyon Dam Environmental Impact Statement.

The **Dolores Project Resources Optimization Study** was initiated in 1990, in cooperation with numerous interested agencies and groups, to research the needs and opportunities to enhance the project's resources. Currently, alternative operating criteria are being developed and evaluated, and interagency studies are being conducted to evaluate the downstream fishery needs. The study is scheduled for completion in FY93.

Reclamation initiated efforts to **identify and resolve instream flows and water management issues**, including multiple uses on the North Platte, Wind River, Beaverhead, and Arkansas Rivers.

A new operation and instream flow agreement was developed for **Buffalo Bill Dam and Reservoir** on the Shoshone River in Wyoming, significantly increasing minimum releases from the reservoir while meeting other water needs.

Reclamation completed a **water sale to the State of Wyoming** for increased instream flows in Snake River.

## **Wetlands and Riparian Habitat**

*Goal: To manage Reclamation activities in support of the national goal of no overall net loss of wetlands and to protect riparian habitat.*

*Reclamation implemented the following activities in support of the national goal of "no overall net loss" of wetlands:*

A memorandum of understanding was executed with the Fish and Wildlife Service to accomplish the goals of the **North American Waterfowl Plan** and inventory wetlands on Reclamation land.

**Wetlands and riparian habitat inventory** was initiated in FY90 on 8.5 million acres of Reclamation-owned land. This activity is a cooperative cost-share agreement with the Fish and Wildlife Service's National Wetlands Inventory.

Reclamation initiated **wetlands and riparian habitat restoration and enhancement** activities at 20 projects.

Reclamation developed more than 5,150 acres of **new wetlands and wildlife habitat** in Idaho, Wyoming, North Dakota, and California.

A cooperative program of **wetlands research** was initiated with the Eastern Municipal Water District in southern California to develop wetlands that can also serve to condition wastewater for reuse in ground-water recharge, irrigated agriculture, or for additional wetlands.

An 18-acre parcel of Reclamation land, valued at \$750,000, was exchanged to establish **new wetlands in central California**.

Reclamation released a **management plan for the San Joaquin River basin** in California that focuses on the needs of chinook salmon, water quality conditions, wetlands, wildlife, and reservoir fishery and recreation.

Reclamation obtained approval from the State of California for the **Kesterson mitigation and enhancement proposal** which, when completed, will result in the protection of about 6,200 acres of currently unprotected wetlands and the development of about 4,500 acres of new wetlands.

The **Jordanelle Wetlands Mitigation Plan** was developed as a cooperative effort among Reclamation, State of Utah, and other Federal agencies. The plan dictates full mitigation for wetlands values lost within the reservoir basin through the creation of new wetlands using project water and the enhancement of existing wetlands.

Reclamation initiated a **wetlands restoration program along the lower Colorado River**. These wetlands have been severely degraded due to the high flows of 1983-85. The restoration program is a joint effort headed by Reclamation. Participants include the Fish and Wildlife

Service, BLM, Arizona Game and Fish Department, California  
Department of Fish and Game, and the Colorado River Indian Tribes.

*Other activities include:*

In FY90, Reclamation initiated a 5-year research program entitled  
**"Wetland Ecology and Utilization"** which will focus on basic wetland  
processes.

In FY91, Reclamation conducted wetlands field research at Upper  
Klamath Lake, Oregon; Eastern Municipal Water District, California;  
American Falls Reservoir, Idaho; and Heart Butte Reservoir, North  
Dakota.

## **Hazardous Waste**

*Goal: To ensure that Reclamation's lands are free of hazardous and toxic wastes and to  
assist other Federal and State agencies in the protection and restoration of the  
Nation's surface-water and ground-water resources from hazardous waste  
contamination.*

*Reclamation accelerated the hazardous waste cleanup program on project lands  
including the following specific activities:*

Site investigations were completed at the **New Waddell Dam  
dump, Arizona.**

Plans were completed for removal of mine tailings from the **Jordanelle  
Reservoir site, Central Utah Project.**

Reclamation implemented cleanup and control of selenium from  
irrigation runoff at the **Kesterson Wildlife Refuge, Central Valley  
Project, California.**

The Pacific Northwest Region completed a hazardous material cleanup  
at the **Smith Canyon Wasteway on the Columbia Basin Project,  
Washington**, and is preparing for further removal of toxic materials  
from the dump site.

*Reclamation also provided technical assistance to other Federal and State agencies for managing and cleaning up hazardous and toxic waste sites. From 1988-91, assistance was provided at 95 sites through interagency agreements totaling \$111 million, including the following:*

Reclamation worked on 52 **Superfund sites** and/or agreements with the Environmental Protection Agency. Reclamation completed nine projects and worked on six sites and/or agreements with agencies other than the Environmental Protection Agency.

A cost comparison for construction of various retaining wall options was performed at the **Aladdin Plating Site, Pennsylvania** (Environmental Protection Agency Region 3). Reclamation also performed a qualitative review of the various options for the Remedial Project Manager (RPM) to consider.

Reclamation prepared an engineer's estimate for the tank farm dismantling contract at the **Douglassville Disposal site in Pennsylvania** (Environmental Protection Agency Region 3).

Reclamation reviewed the draft construction management plan and prepared an engineer's estimate for a portion of the work at the **Pinettes Salvage Yard site in Maine** (Environmental Protection Agency Region 1). Reclamation also provided a review of some architectural and engineering (A&E) design changes and an engineer's estimate for the changes. Reclamation performed a site review of the alternative remedial contract strategy (ARCS) contractor and subcontractor's operation and provided recommendations to the RPM for consideration.

Reclamation provided technical assistance and engineering management services for conducting site investigations, preparing specifications, and managing construction oversight of a new ground-water treatment system at **Fairchild Air Force Base, Washington**. Also assisted the U.S. Air Force in cleaning up hazardous waste at **Vandenberg Air Force Base, California**, and **F.E. Warren Air Force Base, Wyoming**.

Reclamation **provided assistance** to the Department of the Army, Department of Housing and Urban Development, Forest Service, Bureau of Indian Affairs, National Park Service, Bureau of Mines, and the Geological Survey.





## SAFEGUARDING THE INVESTMENT

Since the inception of the Reclamation program in 1902, more than \$16 billion has been invested in water resource and hydropower facilities. Hoover, Grand Coulee, Shasta, and Glen Canyon Dams are among the 340 dams built by Reclamation with Federal funding and in cooperation with local water and power users. Reclamation is the largest supplier and manager of water in the West, delivering 10 trillion gallons of water per year to 28 million municipal and industrial and agricultural users.

Reclamation projects deliver irrigation water to about 10 million acres of farmland which annually produce crops valued at nearly \$9 billion. While this acreage is only about 3 to 4 percent of the Nation's croplands, the irrigated lands served by Reclamation produce 60 percent of the Nation's vegetables, 25 percent of its fruits and nuts, and 3 to 4 percent of the agricultural program crops grown in this country.

Fifty-two hydropower plants on Reclamation projects have an installed capacity of 13,800 megawatts, and they have generated over 40 billion kilowatthours in each of the last 3 years. Reclamation reservoir operations prevent an average of \$200 million in flood losses annually. Public use facilities at 300 recreation areas on Reclamation projects attracted nearly 80 million visitors each year, and the enhanced year-round regulation of rivers and streams by Reclamation has provided prized recreation and sport fishing opportunities for millions.



*The review of operations and maintenance is an important part of safeguarding the investment in existing facilities to ensure their continued safe and reliable operation. Achieving added value through improved asset management and cooperative partnerships is another important aspect of safeguarding the investment.*

The investment in Reclamation projects must be protected and maintained so that future generations can realize the benefits of the program. Under Reclamation law, much of the capital investment in project facilities must be repaid by project beneficiaries, thus requiring Reclamation to be diligent in carrying out its cost recovery responsibilities. Compliance with the requirements of the Reclamation Reform Act of 1982, as amended, is also critical to ensure that the benefits of the program are widely distributed. Reclamation has placed increased emphasis on the operation and maintenance of project features and has pursued a comprehensive safety of dams program to ensure the safety of all Reclamation dams and to provide technical assistance to others on dam safety activities. Safeguarding the investment in existing projects to ensure their continued safe and reliable operation is a primary responsibility of Reclamation.

### Facility Maintenance and Improvement

*Goal: To provide a maintenance and improvement program for Reclamation facilities which ensures reliable, safe, and economic service.*

*Specific activities included:*

A multi-year program was initiated to **reduce the accumulated backlog of deferred maintenance** on Reclamation facilities.

Reclamation conducted **operations and maintenance examinations** of 312 major structures and 274 carriage and distribution systems.

A **prioritization system for funding operation and maintenance activities** was established. Reclamation initiated improvements in the annual formulation of its operation and maintenance program.

Reclamation completed an **experimental underwater canal lining project** at the Coachella Canal, California, which provides an additional option for lining a canal that cannot be taken out of service because of year-round operation.

Reclamation issued the notice of **substantial completion** and initiated repayment on the **Oroville-Tonasket Unit Extension** which replaced a deteriorated wooden flume distribution system serving the 10,000-acre Oroville-Tonasket Irrigation District, Washington.

Research was completed that demonstrated **sterile grass carp as a feasible tool to biologically control aquatic weeds** in western irrigation systems. This reduces or eliminates the use of expensive herbicides in many aquatic systems.

Reclamation conducted **corrosion surveys** and located initial areas for pipeline excavation for in-place condition assessments and repair of the Central Arizona Project siphons. Similar surveys were conducted on similar pipe on the Navajo Indian Irrigation Project in New Mexico.

Specialized **tests to detect water leaks** in large water-cooled hydrogenerator windings at **Grand Coulee Powerplant** were developed. This saved revenues of up to several hundred million dollars which may otherwise have been lost due to forced outages and unscheduled maintenance.

Reclamation completed 15 **generator voltage regulator tests at project powerplants**, ranging from detailed commissioning tests to realignments of existing equipment. These tests were conducted to assure maintenance of power system integrity in the West, avoiding multi-million dollar blackouts.

Reclamation initiated development and installation of a **system to monitor** the effects of potentially harmful **geomagnetic storms on the interconnected power system**. This system will avoid the possibility of a Pacific Northwest blackout and damage to multi-million dollar transformers through early warning and corrective action.

An ongoing program was developed to investigate and **assess health risks** from exposure to magnetic fields at **Reclamation electric power facilities**.

## Dam Safety

*Goal: To ensure that Reclamation dams are safe and to provide technical assistance to others on dam safety related issues.*

*The program of maintaining Reclamation dams in a safe condition and ensuring that they do not pose an unacceptable risk to the public included the following:*

**Safety of Existing Dams (SEED) examinations** were performed on 261 dams; and instrumentation monitoring was continued on 258 high and significant hazard Reclamation dams, with over 1 million pieces of information collected and evaluated annually. Seismic monitoring was continued at 43 dams, and 2 structures were upgraded to "real time monitoring." In addition to the ongoing early detection components of the SEED program, 113 Hazard Classifications, 64 SEED Analyses Reports, and 47 Modification Decision Analyses were completed. To date, 28 dams have been evaluated as satisfactory without any modification.

**Safety of Dams (SOD) structural modifications** were completed on 7 dams during this time period, to bring the total dams modified since passage of the 1978 Reclamation Safety of Dams Act to 24 dams. Thirty-six dams are presently in corrective action studies, with 7 receiving interim corrective action; and 16 dams are in final design or construction. Thirteen dams have been identified for installation of early warning systems to reduce the risk to the public.

A research program was initiated to develop **flood overtopping strategies for embankment dams**. Initial results of this research have provided savings estimated at \$4.8 million for Arthur R. Bowman Dam in Oregon. Other dam safety research since 1984 has reduced the modification cost of Salt River Project dams in Arizona by over \$140 million.

*Continued providing dam safety design and construction management assistance to Interior agencies, including the Fish and Wildlife Service, National Park Service, Bureau of Indian Affairs, and several Indian tribes. Reclamation is the lead agency in Interior for dam safety, with the Commissioner chairing the Departmental Working Group on Dam Safety. Activities include:*

Reclamation established a **Technical Ranking List** for all high and significant hazard Department of the Interior dams. The list ranks all dams based on the severity of the safety deficiencies, thus enabling Interior managers to focus corrective action and funding on the highest-ranked structures.

During FY89 through FY91, \$13.2 million in **reimbursable program services** have been provided.

- Services provided to the **Fish and Wildlife Service** include construction management at one dam and final designs at two dams.
- Services provided to the **National Park Service** include 47 dam safety and public safety examinations, 27 downstream hazard classifications, final design at 1 dam, and construction management and contract administration services at 5 dams.
- Services provided to the **Bureau of Indian Affairs** include 118 dam safety examinations, 47 downstream hazard classifications, 7 analyses reports, 5 deficiency verifications, 2 conceptual modification designs, and 1 final modification design. Reclamation has entered in contracts with the Confederated Salish and Kootenai Tribes and Rosebud Sioux Tribes to provide engineering and construction management services.
- Reclamation began modifications on the Bureau of Indian Affairs' Coolidge Dam, Arizona, under the SOD Program.

*Reclamation also provided technical assistance to others on dam safety issues as follows:*

Reclamation provided training for 150 Federal, State, and local dam safety officials in **SEED Seminars** in FY89 and FY91; and 35 foreign professionals participated in a FY90 SEED Seminar. Approximately 60 Malaysians received training in FY89. Foreign visitors have also received training in the Safety of Dams program.

Reclamation has continued to perform as the lead Federal agency in the **Training Aids for Dam Safety (TADS)**. Nineteen of the 21 TADS modules have been completed, and approximately 500 copies are in circulation in the United States and 15 foreign countries.

On **Costilla Dam and Santa Cruz Dam, New Mexico**, which are being modified under the State of New Mexico dam safety program,

Reclamation designed the modification and is supervising construction as a consultant to the New Mexico Interstate Stream Commission.

Reclamation analyzed corrective action concepts, completed early warning feasibility studies, and reviewed designs for **Tongue River Dam**, which is being modified under the Montana State dam safety program.

## Recovering the Federal Investment

*Goal: To ensure that Federal investments are recovered in an effective and businesslike manner, consistent with Reclamation law.*

*Reclamation activities include:*

A **fiscal reform program** throughout Reclamation was initiated emphasizing the application of sound business practices. The tabulation on the following page shows the Reclamation Fund Collections for the past 3 years. Total receipts in FY91 were \$851 million. The pie charts in the back of this report show the annual new obligations and receipts for each of the 3 fiscal years.

A total of 14 Central Valley Project, California, **water service contracts** was renewed to recover cost of service, resulting in an annual increase of about \$7 million in recovered costs. A fifteenth contractor is paying the cost of service under a court order.

Central Valley Project contractors have volunteered to pay full **operation and maintenance costs** above the contract obligation.

Additional revenue is being recovered attributable to the **Reclamation Reform Act (RRA)**. In FY91 the Central Valley Project revenues from RRA were over \$10 million, of which about \$7.5 million came from escrow when the court ruled favorably for the United States. Interest revenues generated by RRA enforcement amounted to \$4.2 million in FY91.

Bureau of Reclamation Analysis of the Reclamation fund collections <sup>1</sup>			
	Fiscal years		
	1991	1990	1989
Direct collections			
Loan repayment—loans	\$ 981,852	\$ 1,514,312	\$ 244,925
Loan repayment—drought	2,279,856	661,967	737,820
Miscellaneous interest	23,588,879	15,174,831	9,691,115
O&M expense repayment	460,311	700,694	62,026
Miscellaneous fees, special benefits	5,310,745	1,218,323	(413,588)
Rent on land	3,072,485	2,316,454	2,447,721
Royalties on natural resources	658,855	1,492,348	671,009
Sale of timber, other resources	353,372	335,741	217,693
Sale of electric energy (BPA) <sup>2</sup>	0	0	0
Construction repayment	27,799,689	26,978,982	26,272,575
Sale of public domain	760,226	77,014	74,522
Sale of electric energy	4,774,443	4,684,876	5,382,420
Sale of water service	40,181,027	37,613,237	51,264,149
TOTAL direct collection	110,221,741	92,768,778	96,652,389
Accretions to the Reclamation fund			
Miscellaneous interest	4,933,762	3,355,612	5,497,303
National resources (geothermal, potash, other)	367,814,774	348,829,962	332,679,892
Sale of timber	0	18,892,762	5,510,312
Miscellaneous DOE-FERC <sup>3</sup>	5,613,973	1,012,947	2,998,325
Sale of public domain	19,597,504	5,151,609	10,499,289
Other miscellaneous undistributed	0	(1,124,740)	893,620
TOTAL accretions	397,960,012	376,118,152	358,078,740
TOTAL receipts	508,181,754	468,886,930	454,731,129
Other collections			
Agri-FmHA <sup>4</sup> loan repayment drought	170,643	123,299	143,020
DOE-FERC headwater benefits	3,565,956	5,193,835	1,554,628
Other collections—DOE			
BPA/WAPA <sup>5</sup> sale of electric power	333,411,967	328,389,854	202,152,198
WAPA miscellaneous fees	5,891,010	5,828,682	4,421,898
TOTAL other collections	343,039,575	339,535,671	208,271,743
TOTAL receipts	\$851,221,329	\$808,422,600	\$663,002,872

<sup>1</sup> Figures have been rounded.<sup>2</sup> Bonneville Power Administration.<sup>3</sup> Department of Energy—Federal Energy Regulatory Commission.<sup>4</sup> Department of Agriculture—Farmers Home Administration.<sup>5</sup> Western Area Power Administration.

Revenues from Central Arizona Project **interim water service contracts and power sales** totaled: \$78.6 million in FY89; \$88.3 million in FY90; and \$81.6 million in FY91.

Reclamation initiated a **review of cost allocation and repayment** of all projects in the Great Plains Region, with the goal of improving financial management of existing projects.

Reclamation requested a **review by the Inspector General** to assist us in addressing miscellaneous revenues.

### Reclamation Reform Act

*Goal: To ensure that the beneficiaries of Reclamation's irrigation water supplies receive only those benefits prescribed by Federal Reclamation law.*

*Key Reclamation activities include:*

During FY90, Reclamation completed a 3-year effort to review all 355 water districts subject to the **acreage limitation provisions** of Reclamation law. These districts include more than 37,000 landholders who are required by the Reclamation Reform Act to declare their landholdings. Initial audits were completed of all 1,500 landholders and entities that hold or operate more than 960 acres, as required by the 1987 amendments to the RRA. Nearly all of the 1,500 landholders and entities were found to be in compliance with the law.

Reclamation submitted the Third Annual Report to the Congress on *Reclamation Reform Act Enforcement Activities*. The report identified certain outstanding issues, the resolution of which would assist Reclamation's administration and enforcement of the Act.

Reclamation initiated detailed **audits of operators** believed to be in violation of the law. One case was forwarded to the Department's Inspector General for investigation of potential criminal fraud. Other audits ongoing at the end of FY91 will be forwarded to the Inspector General for investigation when Reclamation's detailed examinations are completed.



## Building Partnerships

Reclamation has continued to pursue comprehensive solutions to complex water resource problems. Finding balanced solutions which can be implemented at a reasonable cost while simultaneously protecting the environment, maintaining high safety standards, and protecting Federal investments requires innovation, creativity, farsightedness, and close cooperation with other Federal and non-Federal entities. Reclamation's unique scientific, engineering, and technical expertise and resources have helped in pursuing those objectives.

Reclamation is pursuing opportunities to enlist the talents and resources of others in confronting the economic and technological changes of the 1990's and beyond. By working with Federal, State, and local Governments and the private sector to develop solutions to water resource problems, Reclamation can most effectively help satisfy the Nation's water and related resource needs. Cooperative initiatives include facilitating exchange of technical information with other agencies, academic institutions, foreign governments, and the private sector; sharing assets and participating financially with others to enhance the collective ability to develop and manage water resources; transferring ownership and/or operations of facilities and lands when in the public's best interest; and participating in demonstration and technology transfer programs.



*Diverse partnerships are essential to accomplishing Reclamation's mission, ranging from cooperative education and employee recruitment programs to cooperative resource management, development, and protection efforts. Here, Reclamation joins the Environmental Protection Agency and Idaho State Vocational Rehabilitation for hazardous waste cleanup training exercises.*

Cooperative programs are being developed with schools and universities, State and Federal agencies, water and power user organizations, environmental groups, and the public to encourage involvement and foster the exchange of information in resource management, development, and protection activities.

## Working and Investing Together

*Goal: To carry out Reclamation's responsibilities in cooperation and partnership with others.*

*The following activities were undertaken to enhance the management, development, and protection of the Nation's natural resources through partnerships with others:*

Reclamation continued the policy of **transferring completed water service facilities** to local water user organizations for operation and maintenance, as soon as the organizations become capable of assuming these functions. Reclamation transferred 27 project facilities to water user organizations. Also operation and maintenance of various Garrison Diversion Project, North Dakota, facilities and the Helena Valley Pumping Plant, Montana, were transferred to irrigation districts in FY91.

Federal assistance was provided through **loans to various** organizations for the purpose of constructing or improving water resource development in the West. Reclamation received notices of intent to apply for loans from 10 organizations and continued planning studies on 36 projects in FY90.

Reclamation entered into agreements in FY89 with the Fish and Wildlife Service and Trout Unlimited to undertake joint **Fish and Wildlife enhancement** projects to improve aquatic and upland terrestrial habitat associated with Reclamation facilities.

A cooperative agreement was signed in FY90 with the **Bass Anglers Sportsmen Society** to protect and enhance habitat for bass and other warm-water fish species. Initial work is the reestablishment of warm-water fisheries in Lake Trinity, California.

Reclamation entered into a multi-agency cooperative agreement in FY91 with Amerifish Corporation, "Fishing Has No Boundaries," to promote

and facilitate **fishing access to the disabled community**. As a result of a training seminar conducted by Amerifish Corporation for Reclamation employees, several handicapped fishing/boating events are being planned.

Along with other Interior agencies, Reclamation signed an agreement with the **Go Camping America Committee** to promote the availability of camping and enhance the management of public campgrounds and facilities.

Reclamation continued installation and testing of the **Transient Excitation Boosting System at Grand Coulee Third Powerplant** as a joint effort with the Bonneville Power Administration to increase the security and to prevent blackouts of the Western interconnected power system. Alternatives to this \$300,000 environmentally benign device would have required additional transmission lines and/or additional powerplants, both multi-million dollar efforts with environmental impacts.

## Engineering and Technical Support

*Goal: To provide engineering and technical support to Federal and State agencies, United States-administered Territories and Commonwealths, Native American tribes, water user organizations, environmental groups, and others.*

*Reclamation provided scientific, engineering, and technical support to Department of the Interior and other Federal agencies including:*

Reclamation provided increased **construction support** for the Department of the Interior and other Federal agencies which made use of Reclamation's extensive experience in constructing, contracting, managing, and operating complex facilities. Technical assistance was provided to other Federal and State agencies for managing and cleaning up hazardous and toxic waste sites. From 1988-91, Reclamation provided assistance at 95 sites through interagency agreements totalling \$111 million.

Reclamation provided **engineering and geologic support** to the Geological Survey as part of the Department of Energy's national effort

to determine the site suitability of Yucca Mountain, Nevada, as a nuclear waste repository.

Reclamation assisted several Federal, State, and local agencies (Fish and Wildlife Service, Forest Service, Colorado, Arizona, and Washington) in developing and testing the safety and hydraulic performance of low flow river weirs for **boater safety**.

Technical assistance was provided to the Department of Energy in its review role for the **Superconducting Super Collider Project** near Dallas, Texas. Reclamation provided geotechnical oversight on the design and construction of the underground facilities, including 54 miles of tunnels, 38 shafts, and the large interaction halls. Reclamation reviewed initial designs and specifications for the first three tunnel and shaft segments.

Thirteen **Comprehensive Construction Training Program (CCTP) courses** were completed, bringing the total to 29 self-paced, text-based courses now available. Reclamation provided CCTP material to other Interior agencies, and on a reimbursable basis to other Federal agencies, water user organizations, and private sector firms.

The Pacific Northwest Region has developed interagency agreements with the Department of Energy (Bonneville Power Administration), Environmental Protection Agency, Forest Service, other Department of the Interior agencies, Department of the Defense (Air Force), and the states of Idaho, Montana, Oregon, Washington, and Wyoming for providing **investigative, design, and construction management technical support**.

*Reclamation also provided engineering and technical support to Native American tribes:*

Reclamation assisted the **Three Affiliated Tribes of the Fort Berthold Reservation**, North Dakota, awarding a construction contract for two lake intakes, and completed designs for water supply systems, which include four water treatment plants. The Standing Rock Sioux Tribe awarded a contract for the 23-mile Luke White Lightning pipeline,

and the Devils Lake Sioux Tribe completed the construction and testing of three production wells to supply the four major Indian communities on the Fort Totten Reservation.

Reclamation entered into agreement with the **Confederated Salish and Kootenai Tribes** to perform engineering and other services related to dam safety operations for dams on the Flathead Indian Reservation, Montana, which are under the jurisdiction of the Bureau of Indian Affairs, Flathead Agency Irrigation Division.

Reclamation acquired data for the Big Chino Valley to resolve water rights issues for the **Fort McDowell Indian Tribe in Arizona**.

An agreement was signed with the Bureau of Indian Affairs to perform dam safety studies for 12 dams on the **Navajo Indian Reservation**. Deficiency Verification Analyses were completed for three dams.

Reclamation continued to construct the **Navajo Indian Irrigation Project in New Mexico** by providing design and construction management for the Bureau of Indian Affairs. By the end of 1991, six blocks were completed and are capable of irrigating 60,000 acres of land. Construction of block 7, schedule 3, is nearly complete; and block 7, schedule 4, will start in summer 1992. Block 7 will add about 10,000 additional acres of irrigated land to the project. The entire project involves 11 blocks and will have a total of 110,630 acres of irrigated land.

## Assisting Other Nations

*Goal: To provide reimbursable technical assistance, training, and transfer of technology to foreign countries in support of United States foreign policy. To acquire new or improved technologies from other countries. To assist American private sector firms in competing better internationally.*

*The following activities were continued or undertaken:*

Reclamation continued to provide **technical assistance to Brazil** with a resident team and numerous temporary assignments. The agreement was extended through 1995. Important contributions were made in

preparing a wide array of water resources planning and design manuals and organizing remote sensing and geographic information system center.

In FY91 Reclamation began to provide technical assistance to the **Cypriot Ministry of Agriculture and Natural Resources Water Development Department** in the development of a comprehensive system analysis study for the main Cypriot water resource project.

Reclamation continued to provide technical assistance with resident staff to the **Government of Egypt** related to the improvement of existing, or the development of new, hydrologic and hydraulic computer models.

Reclamation continued to provide technical assistance, review, and advice to the **Egyptian Electricity Authority** on the design, fabrication, and installation of the turbine runners and associated electrical equipment of the High Aswan Dam Power System. Work began on disassembly and installation of new turbine runners for the sixth and final pair of units in FY91. This project will ultimately involve approximately \$130 million in equipment sales to the United States private sector.

Technical assistance was provided to the **Public Utility Agency of Guam** throughout FY89, 90, and 91. Reclamation signed a new agreement in FY90 which extends the assistance program on the island through 1992.

Reclamation met with counterparts from two **Israeli ministries** to discuss future cooperative exchange of technology in several areas, including desalination.

Reclamation continued to provide technical assistance during first filling and project startup of **Sungai Batu Dam in Malaysia**.

The Commissioner of Reclamation travelled to **Mexico** in FY91 to meet with counterparts from the Comisión Nacional del Agua (CNA). The CNA desires to cooperate with Reclamation in a wide variety of technical areas related to water resources development.

Reclamation continued providing technical assistance to the **Water and Power Development Authority of Pakistan**. A new agreement was signed in FY90, which authorizes continued assistance until completion of the Fourth Drainage Project.

Technical assistance was provided to the **Commonwealth Utilities Corporation of the Commonwealth of the Northern Mariana Islands (Saipan)** throughout FY89, 90, and 91. A new 3-year agreement was signed in FY90.

Under an umbrella agreement of the **U.S.-Saudi Joint Commission on Economic Cooperation**, Reclamation provided technical assistance to the Saline Water Conversion Corporation. In FY90, the umbrella agreement was extended until 1995.

Reclamation concluded a 15-year cooperative exchange program with **Spain** in FY89 and began to discuss prospects for new activities. Reclamation also concluded a 5-year program of advisory assistance to the **Moroccan National Meteorological Organization**. The program entailed transferring technology required for a scientifically-based precipitation enhancement program that could be operated as an integral part of that country's overall water resource management program.

Technical assistance to Taiwan, through the **American Institute in Taiwan**, was continued during FY89, 90, and 91. Reclamation's assistance has been expanded through additional work items and funding. Through the efforts of the design team and extended temporary duty assignments, Reclamation contributed substantially to successful construction of Liyutan, Nanhua, and Mutan Dams.

Through an agreement with USAID, Reclamation continued providing atmospheric resources research assistance to the **Royal Rainmaking Research and Development Institute of Thailand**.

Reclamation continued providing professionals to serve on **technical consultancy boards** to assist various international lending organizations (e.g., World Bank, Asian Development Bank) and individual countries with project evaluations. Assistance was provided to People's Republic of China, India, and Pakistan. Reclamation also

continued to provide in-country dam safety and other training to various countries, including India, Malaysia, and Taiwan. In addition, Reclamation provided personnel for short- and long-term temporary assignments to support our ongoing projects and to provide assistance on one-time-only programs.

Reclamation continued to develop and coordinate **training programs** for foreign government and international agency officials in the fields of water resources development and management. Programs varied in content and length, depending upon the needs of the individual trainees and their organizations.

**Short-term visits** were arranged to various Reclamation facilities and/or dialogues with the technical staff for approximately 300 official visitors to the Denver Office and an additional 700 visitors throughout Reclamation.

Reclamation continued the program for **translating foreign language engineering documents into English** for use within Reclamation. These documents are centrally deposited in Reclamation's Engineering and Research Library and the Library of Congress National Translations Center and are subsequently included in the World Translations Index.

As part of an **international publication exchange program**, Reclamation distributed its most recent technical publications to 300 international organizations and coordinated the receipt of hundreds of technical publications from numerous international water resource agencies and organizations. The majority of these documents are deposited in either Reclamation's Engineering and Research Library or retained by the local technical community and/or universities.

## Outreach

*Goal: To seek input and involvement of all interested parties in the assessment of resource needs and the development of programs. To disseminate factual and timely information concerning Reclamation programs. To further public education and involvement in resource management, development, and protection.*

*The resources education program was pursued in cooperation with the academic community as follows:*



The **Water Education for Teachers Program (WET)** and the Western Water Course was initiated as Reclamation's outreach and education program to teach students and adults about water issues, water management, and decisionmaking on uses.

Reclamation conducted an **apprenticeship program** at Yellowtail Dam, Montana, to train Native Americans in powerplant operations; three members of the Crow Tribe graduated.

Reclamation expanded **hiring of financially disadvantaged** youth under the Federal Junior Fellowship Program.

The **Denver Office Environmental Education Program** was initiated in FY90 to enrich educational programs at all levels and to support, encourage, and prepare students for careers in science, mathematics, and engineering. The program was expanded in FY91 to include educational partnerships with other Department of the Interior agencies, other Federal agencies, and additional schools. During FY90 and FY91, the program reached an estimated 84 teachers and 1,200 students.

Reclamation entered into a cooperative effort with the University of Houston, Texas A&M University, and the University of Texas at El Paso to continue **research activities at the El Paso solar pond test facility**. Research focused on advancing solar pond technology toward commercial applications for supplying process heat, electric power to the utility grid, and desalination to provide fresh water.

In the fall of 1991, as part of Yuma Projects Office's **public education and partnership programs**, approximately 50 local students visited the Yuma Desalting Plant, Arizona. They toured various offices and listened to presentations on topics including desalting, information resources management, geology, and computer aided design. Some students spent the day with engineers to get a feel for the functional side of engineering.

Reclamation's Denver Office continued to host the annual **Colorado High School Bridge Building Contest**, which was co-sponsored by the Professional Engineers of Colorado, the Richardson Structural Engineering Foundation, and the Colorado Department of Education.

For the 25th annual contest in 1991, 92 students from 41 Colorado schools submitted model bridges built of bass wood according to strict contest guidelines. The top two winners will participate in the national contest at Brookhaven National Laboratories.

*Other activities included:*

In FY90, operation of **Reclamation's Volunteer Program** began through which non-Reclamation people voluntarily donate their services to Reclamation activities. A total of 52 people provided over 7 work-years of services in FY91. Most of the volunteer work was done in the area of operation and maintenance of facilities and in providing clerical and office support.

Pacific Northwest Region personnel participated in the **Crooked River Symposium in Oregon** designed to bring regulators and users of the river together to discuss common goals and issues of concern. They also made presentations and participated in panels at the **Idaho Rivers Conference** that addressed issues and concerns associated with the management of Idaho's rivers.

In FY90-91, **cooperative education positions** in Reclamation were increased from 23 to 95.

Reclamation provided an **engineer instructor** in the summers of 1990 and 1991 to teach junior and senior high school students in a pre-engineering program at the University of Texas.

## Fostering Quality Management

Reclamation's belief that "people are our most important asset" takes on renewed importance as we move closer to the 21st century. Reclamation is committed to employee excellence and creating a work environment conducive to productivity and innovation. This commitment to human resources development and management includes initiatives for strengthening Reclamation's ability to retain and attract top-quality personnel, for enhancing the development of its employees and future managers, and for valuing diversity in its workforce.

Reclamation programs and activities will be conducted in a fiscally-responsible, cost-effective manner with high priority on effectiveness and quality. We will foster organizational excellence by continuing to implement Total Quality Management (TQM) principles throughout the organization, including focusing on client needs and exploring opportunities for providing high quality customer services at the lowest possible cost.



*Reclamation is committed to retaining and attracting top quality people and to organizational excellence, focusing on meeting clients' needs and providing high quality products and service at the lowest possible cost.*

## Human Resources

*Goal: To provide the opportunity and means for our people to be the best they can be and, in turn, to assure Reclamation can effectively and efficiently carry out its mission.*

*Key activities include:*

Reclamation provided leadership for, and actively participated in, the **Secretary's Human Resources Initiative**.

Work on **Reclamation's human resources management and development plan** was pursued, including setting up teams to identify issue areas and possible solutions to challenges in attracting, hiring, retaining, and developing a top-flight staff to meet current and future challenges. Reclamation conducted an All-Employee Survey, prepared an interim progress report, and developed "action plans" based on data received from employees.

Reclamation developed an **Executive, Manager and Supervisory Development Plan**. Reclamation identified a representative group of managers and conducted a front-end analysis to identify knowledge, skills, and abilities needed to be successful in Reclamation at each level of management.

Six participants were selected for the **SES Candidate Development Program**.

Reclamation distributed 3,875 Comprehensive Construction Training Courses within Reclamation and offered numerous Reclamation-wide **training courses** to help meet our goal of retaining and enhancing our existing human resources through training, education, and developmental activities.

Four employees participated in the **Women's Executive Leadership (WEL) Program** in FY90, and five participated in FY91. The WEL Program provides supervisory/managerial training and development opportunities for high-potential employees.

Reclamation expanded the utilization of **work-at-home (flexiplace)** arrangements. Efforts were recognized by the Presidential Council on Management Improvement.

Extensive training was provided in **mediation as a technique in conflict resolution** for over 40 human resources professionals and managers. While the primary focus of the training was to develop improved skills in addressing equal employment opportunity issues, the methodologies are applicable to many other conflict situations.

Several **special emphasis programs** related to human resources development benefitted the community, including the Accountant Intern Program; the Regis College Intern Program; Math, Engineering, and Science Achievement for Hispanic Outreach; Historically Black Colleges and Universities Program; cooperative work programs; and stay-in-school programs.

Reclamation continued to operate five successful **Job Corps Centers** having a combined capacity of about 1,200 students and an average job placement rate of 89 percent. Each year about 500 graduates go on to productive lives in occupational areas such as food services, health services, construction, business, clerical, and automotive. Reclamation received the Department of Labor National Director's 1990 and 1991 awards for "Best Overall Center Operator - Conservation Agencies." Over the centers' 27-year history, the lives of thousands of young people have been positively impacted by the Job Corps.

Reclamation received the **Large Employer of the Year Award** from the Governor of the State of Montana for recruiting and placing eight persons with disabilities in the Great Plains Region and the 1991 **Montana Barrier Awareness Award** for efforts associated with removing barriers for persons with disabilities.

## Organizational Excellence

*Goal: To ensure that Reclamation conducts business in a fiscally-responsible, cost-effective, and ethical manner, placing a high priority on program accomplishment and effectiveness, quality of work, and management control systems.*

*Significant activities include the following:*

A **Strategic Plan** was completed that defines the long-term framework for Reclamation activities and will serve as the basis for all future program and budget development. The Strategic Plan was prepared with extensive input from all employees. The plan consists of five major sections, with a total of 25 program elements. Each element contains a "Guiding Principle" to indicate "Why" Reclamation will do this, a "Goal" to indicate "Where" we want to go, and "Strategies" that state "What" we need to do to reach our goal. The details on "How" strategies will be accomplished will be provided in Implementation Plans which are now being developed for each element.

*Executed a program of implementing TQM principles throughout the organization. Activities included:*

In FY89, TQM was initiated at the **Administrative Service Center (ASC)** with a heavy emphasis on the Payroll Operations Division due to its extensive client base. FY89 accomplishments included increasing payroll system quality from 99.67 percent to 99.73; decreasing labor costs by \$360,000 and full-time equivalent positions by 14.2; and realizing an 11 percent increase (as determined by standard measurement indicators) in organizational effectiveness and quality of worklife.

In FY90, TQM was implemented in the **Assistant Commissioner - Engineering and Research (ACER)** organization. Reclamation established an ACER Quality Management Office to coordinate and oversee all quality improvement and assurance activities, provided TQM training to all ACER employees (over 800), established over 40 process action teams, and developed a TQM tracking system which contains quality improvement ideas and projected cost savings.

Implementation of TQM began in the **Great Plains Region** in FY90 by conducting a feasibility assessment and establishing a Quality Council to guide the TQM effort.

The ASC has established a reputation for its quality program and is frequently requested to provide **TQM training and consultation to other agencies**. The ASC and the Denver Office served as joint hosts for a TQM Forum of government and private sector organizations sponsored by the American Productivity and Quality Center.

*Other activities include:*

Reclamation implemented a new **executive level budget review** process which requires executives and managers to understand their budgets and participate in establishing corporate priorities.

A program was initiated to control the total **cost of doing business** in all aspects of Reclamation work.

Reclamation initiated a series of **service management pilot projects** in the personnel, contracting, information resources, facilities, and financial management areas to help focus employees on identifying their customers and on being held accountable to them for the quality of service provided.

Reclamation institutionalized the **Manager's Conference**, an annual conference where Reclamation managers have the opportunity to interact with their peers by discussing new initiatives, current issues, and challenges. The conference also provides feedback to the Commissioner and Executive Management Committee members on items such as the Strategic Plan and the future of Reclamation.

Thirteen Reclamation **employees who had suffered on-the-job injuries** and were being paid by the Department of Labor, Office of Workman's Compensation Programs, were returned to gainful employment in positions commensurate with their disability.

A new **Movable Property System** was implemented in FY91 to manage Reclamation's accountable movable property and compute monthly depreciation expense. The new system incorporates bar code technology for inventory purposes. It replaces a centralized database on the Cyber mainframe computer with regional databases which currently reside on VAX minicomputers in Denver.

In FY89, the design of the **Automated Records Management System (ARMS)** was completed to replace Reclamation's old classification system for correspondence and records. The implementation of ARMS consists of three phases. The first phase, the implementation of the manual version of ARMS, was accomplished throughout Reclamation in FY90. The second phase, the automation of ARMS Reclamation-wide,

was implemented in FY91. The third phase will be to test the use of Laser Optics Systems to augment the use of ARMS.

Reclamation completed 55 **Management Control Reviews** of internal procedures, processes, and policies to identify and correct management and financial control weaknesses.

Reclamation cooperated with the Office of Inspector General and General Accounting Office which conducted more than 40 **financial and performance audits** of Reclamation's programs and activities. Reclamation formally responded to all audit reports and implemented a majority of the recommendations resulting from the audits.

## Administrative and Support Services

*Goal: To provide high quality customer services at the lowest possible price.*

*Accomplishments during fiscal years 1989, 1990, and 1991 include the following:*

Reclamation continued to provide **cost-effective administrative services** to other Interior or Federal agencies, such as:

- By FY90, **extended administrative systems services** to four additional clients, raising the number of agencies serviced by the ASC to 17. The ASC's Payroll Operations Division, which provided payroll services of \$2.8 billion in salary and benefit payments to over 100,000 people in FY90, received the President's Council on Management Improvement Award for Management Excellence.
- Implemented the **Federal Financial System (FFS)** in Bureau of Mines, Fish and Wildlife Service, and Federal Labor Relations Authority, and initiated implementation for BLM and International Trade Commission.
- The **Denver Cooperative Administrative Support Unit (CASU)** provided significant cost and labor savings to client agencies through the centralization of the services provided. Forty-five agencies now acquire services from the CASU. The



Denver CASU was recognized by the National CASU Office as one of the outstanding service providers in the country in 1991.

- In FY91, the ASC awarded a contract to Federal Data Systems of Bethesda, Maryland, for ADP equipment that will provide the necessary flexibility and capability to allow the ASC to provide **services at competitive price levels** to other government organizations, thus achieving government-wide efficiencies and savings.

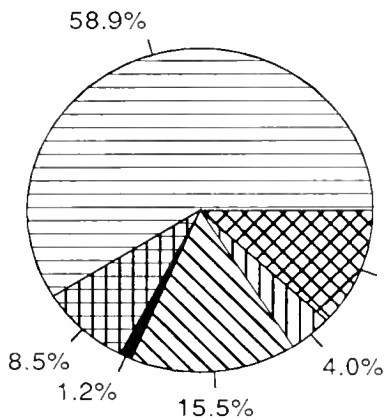
The **Reclamation-wide data communication network** was expanded to interconnect local area networks in 52 offices. The network provides electronic mail services and access to all computer platforms for accomplishing mission-related activities. Reclamation provided computer capacity and data communications capabilities to 11 Interior agencies and 4 non-Interior agencies.

Reclamation reduced the total program cost for the third straight year for the **Department of the Interior Quarters Management Program**. This program establishes rental and utility rates for government-owned housing for 11 agencies in six departments.



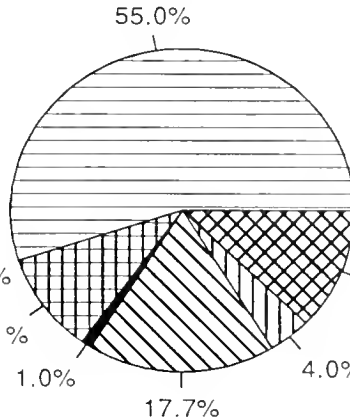
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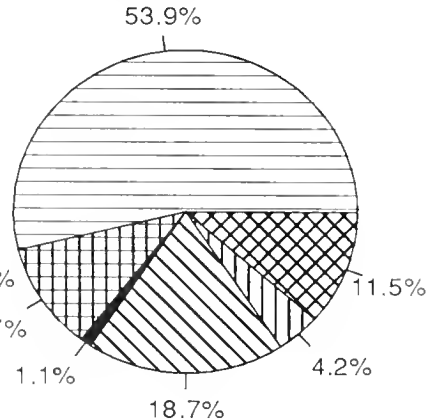
1989

\$1,185,705,000

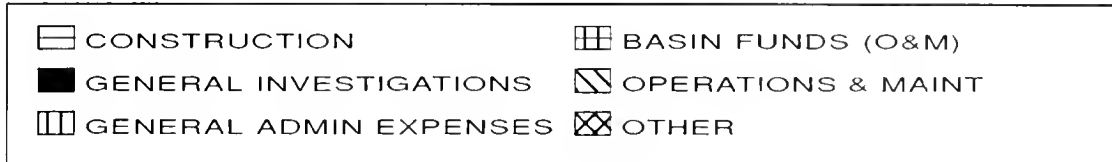


1990

\$1,230,676,000

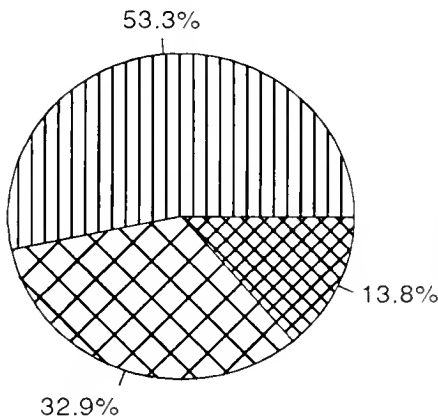


1991



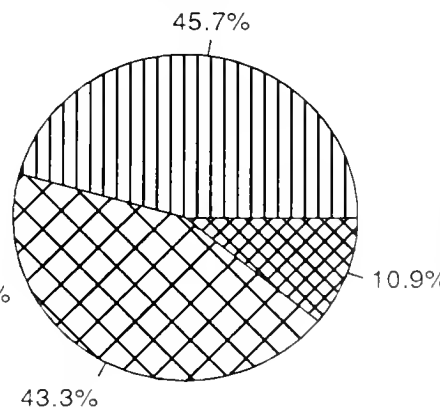
# RECEIPTS

\$653,003,000



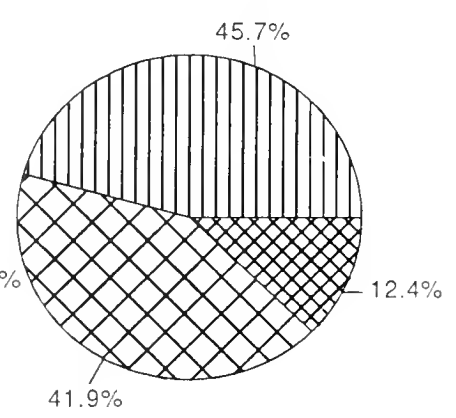
1989

\$808,423,000



1990

\$851,221,000



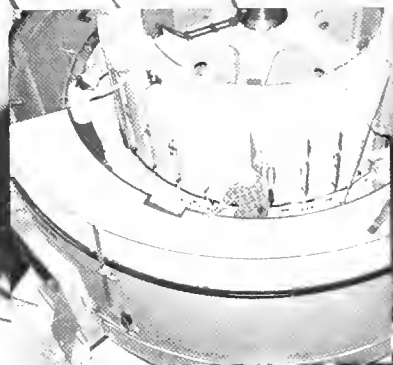
1991













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